CALCUTTA .

GOVERNMENT OF INDIA CENTRAL PRINTING OFFICE,

8, HASTINGS STREET.

Cabbage, see under Brassica (oleracea) capitata

The Cabbage was introduced into India by Europeans at an eair, date. It is how cultivated in the plains, during the cold weather, and in spring and summer on the hills. It is largely grown in the vicinity of towns and cantonments, and is as much eaten by Natives as by Europeans Natives cook the cabbage into curry. The 'drum head' form is that most generally cultivated by the people of India. (Cameron, Mysore)

Cabbage-rose, see Rosa alba, Linn, Rosacem.

CABINET-WORK, FURNITURE, AND GENERAL CARPENTRY,

Abres dumosa
A Smithiana
A Cacaa arabica
A melanoxylon
Acer pictum
Acrocarpus fraximionus
Adenanihera pavonna
Adina cordifojia
Alangium Lamarckui
Alibizzia Julibrissin
A Leibek
A odoratissima

A stipulata
Alnus mtida
Alseodaphne ? petiolaris
Alstonia scholaris
Amoora spectabilis
Anogeissus latifolia

Authocephalus Cadamba.

Aporosa dioica (The Coco-wood of commerce)

Aquilaria Agallocha (Eagle wood

of commerce)

Areca Catechu Artocarpus Chaplasha A hirsuta A integrifolia A Lakoocha A nobiles Atalantia missionis Averrhoa Carambola Barringtonia acutangula Bassia latifolia B Iongifolia Bruguiera gymnorhiza Buchanania latifolia Bursera serrata Calamus Rotang Calophyllum moo'yvllum Carallia integerrima Careya arborea Cassia timoriensis Cedrela Toona Cedrus Deodara Ceratonia Siliqua

Chickrassia tabularis

CACTUS indicus.

Cabinet-work.

Chloroxylon Swietenia. Cinnamomum glanduliferum. Cordia Macleodii. Coriaria nepalensis. Cupressus sempervirens. Dalbergia latifolia. D. Sissoo. Dichopsis polyantha. Diospyros cordifolia. D. cbenum. D. Kurzil. D. montana. Dipterocarpus turbinatus. Dolichandrone stipulata, Ehretia lævis. Elæodendron glaucum Erythrina Indica. Excacana Agailocha E. sebifera. Feroma elephantum. Ficus bengalensis. F. retusa. Garcinia Cambogia. G. Morella. Ginta elegans G travancorica. Gmelina arborea. Grevillea robusta. Guazuma tomentosa. Gyrocarpus Jacquini. Hardwickia binata. Hentiera littoralis. Holarrhena antidysenterica. Homalum tomentosum. Hopea parviflora Ixora parviflora. Jugians regia. Lagerstrœmia microcarpa. Lophopetalum Wallichii. Melia Azadirachta. M. Azedarach. Meliosma Wallichii. Memecylon edule Mesua ferrea Michelia Champaca. M excelsa. M. oblonga.

Mimusopa Elengi, Morus cuspidata. M. serrata. Murraya Konigii, Myrsine semiserrata. Nanclea rotundifolia. Nephelium Longana. Odina Wodier. Ougeinia dalbergioides. Parrotia Jacquemontiana. Pentace burmanica. Phyllanthus Emblica. Pistacia integerrima. Platanus orientalis. Podocarous bracteata. P. latifolia. Poculoneuron indicum. Poinciana elata. Polyalthia cerasoides. Premna tomentosa Prosopis glandulosa. P. spicigera. Prunus Puddum. Pterocarpus indicus. P. Marsupium. P. santalinus Pyrus lanata. Quercus semecarpifolia. Rhododendron arboreum. Rhus Cotinus. Santalum album, Shorea robusta. Stephegyne parvifolia. Stereospermum chelonoides. S xylocarpum. Strychnos Nux-vomica. Swietema Mahagom. Talauma Rabamana. Tamarındus indica. Taxus baccata. Tecoma undulata. Tectona grandis Terminalia Chebula. Thespesia populnea. Ulmus integrifolia. Vitex leucoxylon. Wrightia tomentosa

Cacalia Kleinia, Herb Madr, see Notonia grandiflora, DC, Confositz

C. Kleinia, as in O Shaughnessy, see Onosma bracteatum, Wall, Boragiyacez

Cacao, see Theobroma Cacao, Linn, STERCULIACEE Cactus indicus, Rovb, see Opuntia Dillenii, Haw, Cactee.

The Fever-nut.

CÆSALPINIA Bonducella,

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Cactus tree of the lower Himalaya (referred to by some writers) is Euphorbia Royleana, Bossier, which see.

CADABA, Forsk.; Gen Pl, I, 108.

Cadaba farinosa, Forsk , Fl. Br. Ind , I., 173; CAPPARIDEE.

In Murray's Plants and Drugs of Sind this plant has been mentioned, but its medicinal properties have not been described. It is common in Sind and in the Panish.

Caden, see Phonix svivestris. Roxb : PALME.

CADMITTM.

Cadmium is imported into India as a drug-

CÆSALPINIA, Linn. ; Gen Pl. I., 565.

A genus of LEGUMINOSE and of the Sub-Order CESSLEINIEF, containing some 40 species; inhabitants of the tropics of both hemispheres. There are in India some 60 to 10 sec.

India some g or to species
Robust erect trees, shrubs, or woody nuckly clubbers

[care | car

the genus was named after Andreas Cæsalpinus, who was chief physician to Pope Clement VIII. in the latter part of the sixteenth century.

Cæsalpinia Bonducella, Fleming, Fl Br Int, II, 254.

THE FEVER-NUT. PHYSIC-NUT. NICKAR

Syn -Guilandina Bondicella, Linn G Bondic, W & A . Dale

& Gibs, Bomb Fl . 20. in fart

Vetti-Katkaran (or katlaraun) also latkaranea, latlat a larenti, karangat, katlatu, katlatu segaraph (a libu), hadi, nate karanga, katlatu, katlatu segaraph (a libu), hadi, nate karanga, nate kocanga, libug jiligan hantal lang, kap, latring hati karanga, Olomi, karanga, kukwan, hajirah, katlatura, Almerei, hadi, katlatura, Almerei, hadi, katlatura, Almerei, hadi, katlatura, almerei, katlatura, rateni, hadi, hadi, katlatura, k

Andreas to Al Incident Al Incident Al Incident Al Incident Al Incident Andreas Al Incident Andreas And

dan, kelein, Bigus ; Para gore, Makay Dr. Dymock asysty goest bars the vultur name of Adams of the flows treated to the species name of the pair, as given by both ross in de mod for the first a man and a fit of the first formulat, a fit is ball or fibert.

CÆSALPINIA Bonducella,

The Fever-nut.

Sou Bengal, Burma, and

From seed.
7
From leaves.
8
MEDICINE.

Seeds.

in consulsions and palsy. "The one type so the first is used as a cosmetic; it is said to soften the skin and remove pumples." (Surgon-Major W. Dymock, Bombay.) An oil is also said to be prepared from the leaves.

Medicine.—The Strips on Nurs.—The seeds are viewed as possessing well-marked antiperiodic properties, and are largely used by the natives instead of quinine. For this purpose they are pounded with black pepper, from 5 to 30 grains being regarded as the proper dose. Ainsite seems first to have drawn the attention of Luropeans to this powder, but even up to the present date it has not apparently taken the position which it deserves as a tonic and febriling. It was made officiant in the Indian Pharmacopaia, the dose of powder being 18 to 15 grains.

Powder.

"In Intermittent Feners, especially in those of the natives, this remedy has been found very useful. It is best given in the following form: Take of Bonduc seeds, deprived of their shells and powdered, one ounce; black pepper powdered, one ounce; mix thoroughly, and keep in a well-stop day. The doce is from 15 to 30 grains three times a day

O Shaughnessy remarks, that the second reddens the nut and subsequently "National deddens the nut and subsequently of Ajmere one, one, one,

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In an official report, a c 🕮

of the Indian Pharmacopæia remark that "the seeds are very useful - ' - and tonic' valuable in all ordinary and che-They have also been cases of found userurin sor o ... mble Acoutum heterophyllum in their action, but are preferable to it for cheapness. The root-T -- + myv bark is inferior to the se be substituted for Pulv. spasmodic, and for Gen India the seeds are considered to be hot and dry, usciul to a se swellings, restraining homotrhage, and keeping off infectious diseases. They are also given internally in leprosy, and are thought to be anthelmintic." (Surgeon-Major W. Dymock, Bombay) Dr. Ch. Rice writes to the author that the "seeds are used among the Malays as astringent tonics

Root-bark. II In debility after fevers and other diseases, "the brick of the root of Bondue shrub in to grain doses is reported to be even more effectual than the seeds themselves." (Waring.) It would thus appear that a difference of opinion prevails regarding the properties of the root, but all authors the boundaries of the seeds.

The powdered seeds, with castor oil, and

in bowel complaints. They have also been reported as facilitating child-

Olntment. 12 Leaves.

bay sold for R12 a cwt.

THE LFAVES —"In disorders of the liver the tender leaves are considered very efficacious," (Mr. T. N. Mukharyi's Amst. Cat.) Drury

13 | dered C. 13

birth '

The Fever-nut.

CÆSALPINIA Bonducella.

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says that in Cochin China the leaves are reckoned as a deobstruent and entimenagogue, and that an oil expressed from them is useful in consulsions, pilsy, and similar complaints. Dr. Oh. Rice informs the author that "the young leaves are used in intermittent fevers and for expelling intestinal worms"

At the late Colonial and Indian Exhibition a pale orange-coloured nut was shown by the West

vated form of this plan

"The active principle has not yet been adequately examined. It may perhaps occur in larger proportion in the bark of the root, which is said to be more efficacious than the seeds in the treatment of intermittent fever.

"In order to ascertain the chemical nature of the principle of the seeds, one onne of the kernels was prodered and exhausted with slightly acidulated alcohol. The solution, after the evaporation of the alcohol, was made alkaline with caustic potash, which did not produce a precipitate Ether now shaken with the liquid completely removed the bitter matter, and yielded it in the form of an amorphous white powder, devoid of alkaline properties. It is sparingly soluble in water, but readily in alcohol forming intensely bitter solutions; an aqueous solution is not precipitated by tannic acid. It produces a yellowish or brownish solution with concentrated sulphuric acid, which acquires subsequently a violet bue. Nitric acid is without manifest influence. From these experiments, we may infer that the active principle of the Bondue seed is a bitter substance not possessing basic properties." (Fluck, and Hanb, Pharmacog, pp. 212-17.)

STECIAL OPINIONS—5"The kernel of the seeds is decidedly tonic and antiperiodic, but much inferior in this respect to the cinchona preparations. It is useful in dispensary practice where economy is a deaderatum" (Surgeon R. D. Murray, M. B., Burdwan) "Nata is decidedly antiperiodic, but feeble in its action, requiring 3 to 31 grs of the powdered seed to check an ordinary intermittent fever." (Surgeon R. L. Duit M. D., Pubna) "I have often used it, as an antiperiodic, it is certainly of value. The powdered seed smoked in a hakka, in lieu of tobacco, is said to be very efficacious in colic." (Surgeon-Major C. W. Catthrey, M.D., Morar) "In doves of 5 to 20 grains, the powdered seeds constitute an

MEDICINE.

DICINE.

y practice."
powder, has
the tertian
of cases."
ts artiperion convales-

cence, after fevers" (Austiant Surgeon Sits Churder Bhuttscharp, Chanda, Central Provinces) "The seeds are said to be useful in cole (dose one seed), and the ash as an external application to ulcers." (Surgeon Joseph Parker, M.D., Poora) "The burnt seeds are used with alum and lurnt arecanut as a dentifree, useful in sporps gums, gum-bols, Aca, also

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CÆSALPINIA coriaria.

The American Sumach.

MEDICINE.

DOMESTIC.

Necklaces. 16

lmulets. I7 Rosaries.

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in intermittent fever and debility," (Brigade Surgeon F. H. Thornton, B.A., M.B., Monghyr.) "Sometimes used as a febrifuge in doses of about 30 grains, but has a nauscous taste and does not appear to be an efficacious

antipyretic, and from 10 to 30 grains as a tonic." (Honorary Surgeon Modeen Sheriff, Khan Bahadur, Triplicane, Madras.) "A cake made of 30 grains of the powdered kernel, the contents of one egg, and fried in ghi, is taken twice a day in cases of acute orchitis, ovaritis, and ---- '- wend locally for scorpion-stings," scrofula. boiled with castor oil (Surgeon

or ghi, are

esticles. The tender

leaves are said to be most efficacious." (Honorary Surgeon P. Kinsley, Ganjam, Madras.) "The best vegetable antiperiodic used by natives. This drug might prove very useful if its active properties were brought into a concentrated form as an extract or otherwise." (Surgeon W. G. King, M.B., Madras Medical Dept.) "The nuts ground down and made into a paste are useful in dissolving glandular swellings, buboes, (Honorary Surgeon Peter and swelling of the testicles in the acute stage." (Honorary Surgeon Peter Anderson, Guntur, Madras Presidency.) "Both the nut and the leaf are used internally and externally with good effect in recent orchitis. It is powerless against hydrocele." (Native Surgeon Ruthnam T. Moodelliar, Chingleput, Madras Presidency.)

Domestic Uses .- The nuts are used for making into bracelets, necklaces, rosaries, &c. (Guide to the Kew Museum.) "Necklaces of the seeds "Thant women as a charm to prevent ck, Bombay.) "The seeds are used

· Cameron, Bangalore.) "In Egypt used by women as amulets against

sorcery. In Scotland, where they are frequently thrown upon the sea-shore, they are known as Molucca Beans." (Christy, New Commercial Plants, No. 4, p. 48.)

Dr. Ch. Rice writes to the author that " in the Malay Archipelago they are used for counters and playthings, especially in the game known as tjongka.

Cæsalpinia coriaria, Willd.

THE AMERICAN SUMACH OF DIVI-DIVI. Vern.—Libi-dih, Bone.; Amrique-ka-sumáq, Duk.; Shúmak, Tan.; Sumáque-amriquah, Arab., Pere.; Vilayati-aldekayi, Kan.

References .- Brandis, For. Fl., 157; Gamble's Man. Timb., 135; Govern-

Vol II., 646, 730, nercial Products of Christy's New Com.

The American Sumach

CÆSALPINIA

Pl . Part II . 21 . Drury's Us Pt .02 Mwiler's Extra-Tropical Plants.

Habitat —A small tree, native of South America and the West Indies, found in marshy situations in New Grenada, Mexico, Venezuela, North Brazil, and Jamuica Introduced into India and now almost accli-

Properties and Uses-

Tan—The sinuous pods of this plant have, within recent years, begun to take an important place amongst tanning materials. The chief drawback seems to be in the fact that if the seeds are not removed, the oil which they contain, induces an injurious fermentation, which results in a discolora-

Pods 20

or to prepare from the fresh pods a tanning resinous extract. Lither of these suggestions would most probably minimise the danger, and would have the effect of lessening the charges on freight Recently, 1 large even the Secretary of

ignment was acci-

connection with the Colonial and Indian Exhibition were pronounced far inferior to the usual supply to be had in the market. The tanners who is sited the Exhibition would not look at them, while they professed themselves anxious to investigate some of the paler-coloured briks exhibited, such as Acacac Catechu and A leucophica, and the pods of A ranbia.

A considerable amount of interest has, within the past few years, been taken in the subject of the introduction or extended cultivation of the Divi-divi in India. The following extracts from a memorandum on this subject, published by the Government of India. Revenue and Aericul-

tural Department, may be reproduced here -

"Dr Wallich introduced the Dis-Idis plant into India about the year 1830, and it has now been thoroughly acclimatised in South India, which in soil and climite, resembles its original home. As the plantition near the Government Harness Factory at Causpore proves, however, it can be the convenient that the second of the summer and the frost in the cold weather are, unfortunately, even are authorities are, unfortunately, even for the young seedings. The seeds therefore should, in the first instance, be won in a nursery in May of June, before the commencement of the rains, and the seedings should

ons of

estary

ornamental plant

"The tree is cultivated for its seed pods, which contain a large quantity of a most powerful and a quickly acting tanning material, rather too strong to become a substitue for each or label back, but very valuable as a cleaning and brighten ng agent in the after process of currying, when takes the place of sumather Rhas currial. Both in langitud and at the

C. 22

Powder,

Extracts,

CÆSALPINIA coriaria.

The American Sumach.

Cawnpore Government Factory it is used as a substitute for sumach, which is a dearer article.

"The actual demand for Divi-divi pods is not known. England imports about 4,000 tons every year, in addition to about 12,000 tons of sumach. But as Divi-divi is gradually outling the latter, its demand in France, ammes of t has been in India,

great advantage in its cultivation is, that the tree requires no care after it has once grown up, and the proceeds are net gain, minus the trilling cost of picking the pods. The ground underneath can be utilised for raising fodder grass, and the falling leaves as fuel or manure, thus meeting the three great wants of the Upper Provinces. An acre of Dividivi is supposed to yield not less than one ton of marketable produce, valued in India about R 100, in England R 150." (Mr. T. N. Mukharji, Revenue and Agricul-

tural Department) suppleme The second secon India as •

methods i as to the prospects of the plant becoming a commercial success. In Mr. Duthie's experiments at the Saharanpur Botanic Gardens the trees are planted 15 feet apart each way. The largest plantation of Dividivi in India is that belonging to Mr. J. B. Carbozo, of Perambere, Madras. This gentleman has a plantation of about 600 trees; the trees being 22

Divious tices here. They yield pour neety every year and the secus are regularly distributed gratis to all applicants.

Dr. Bidie of Madras thinks the tree grows best at an elevation of 2,000 feet above the level of the sea, by others, a dry and light soil suits it best; and again, its favourite soil is a heavy clay associated wh Acacia leucophicea Some writers do not think it can ever be cultivated on a large scale in Bengal, because the climate is too moist and the soil not suitable, while Baron von Mueller recommends its introduction in the salt-marshes of Australia. T

signment of the pods from the Western Presidency Divi-divi cultivation.

A correspondent in The Madras Times says "The Divi divi pods are employ 11 --n 50 per cent. of pure tannin. large plantation of this tree l have · 14thor that this is incorrect,

only a few trees exist there], and that its pods are extensively used for giving the skins tha Bangalore skins. If

ployed a solution of The ink used in mo-

made from this plant. The cultivation of this elegant shrub is very easy. The seeds should be sown in March, and the young plants can be removed from the nursery during the following rainy season; they require some

23

watering till they have attained the height of 3 feet, after which no more care is necessary. The plant grows luxuriantly in a clayish calcareous soil, but very slowly in red soil, as I have observed at the Red Hills near Madras" Dr. Ch. Rice draws the author's attention to the fact that Professor Flückiger, in his Pharmakignosi [and] 1, 245, mentions that ink

such as is very abundant in this Presidency, they might be worth coneciing, freeing of the seeds, and shipping in the form of a clean powder closely packed in bags; but to be really remunerative and to show conclusive results, experimental shipments should be tried on a much larger scale than has yet been attempted, and means of continuing the supply must be available, as manufacturers will not try expensive experiments unless with some certainty of being able to get more of the substance tested, in the event of success."

Medicine -According to Dr. Bidie, the pods are astringent. The powder prepared from them is of a light-yellow colour and astringent taste : it has been brought forward as an antiperiodic by Dr. Cornish, who administered it in ninety-four cases of intermittent fever, many of these

sever

pods astringent, antiperiodic, tonic Apothecary Thomas Ward, r leather, and makes very Waltair, Vizagapatam) se (Bomb. Gaz , XV., Pt I

(65), weight 56 lbs.

Cæsalpinia digyna, Rottl; Fl Br. Ind, II, 256.

Syn.—C OLEOSPERMA, Roxb , Ed CBC, 356
Vern—Vokers mul, Hind , Umul kucht, Beng , Nuni gatcha, Tel ,
Vakeri-chebhate, vakers-mula, BomB , Sunletthé, Burm

Habitat -A prickly tree of the Eastern Himalaya, Eastern and West-

ern Peninsulas, and Ceylon. Tan .- Dr. H. McCann, in his Dyes and Tans of Bengal, says that in Cuttack the pods of what appears to be this plant are sold as a tan under the name of Kunts. The word Kunts-paras would appear to be

Oil .- Roxburgh says that an oil is expressed from the seeds, which is used for lamps

MEDICINE.

24

TIMBER.

25 26

TAN. 27

OIL 28 MEDICINE. 20

CÆSALPINIA The Sappan wood Sappan. Cæsalpinia Nuga, Ait , Il Br Ind , II , 255 30 Syn -C PANICULATA, Roxb , Fl Ind , Ed C B C , 358, Wight, Ic , t 36, Dals and Gibs , Bomb Fl , 79, Brandis, For Fl , 157 Vern .- Kaku-mullu in Rheede's Hort Mal , Deya-mamul atteya, Singu , Sakauk, Burm , Aroci mata hiang, Sundaw Habitat.-A scandent, armed shrub, common in Eastern Bengal (Sylhet to Chittagong), the Eastern and Western Peninsulas, and Ceylon Medicine. The roots of this plant are said to be diuretic Dr Rice MEDICINE. draws attention to the fact that the root of this plant has been reported as useful in gravel and stone in the bladder, and that the juice of the stem 31 has been used externally and internally in eye diseases. For the same purposes are used also the roasted fruits, which have a bitter taste. The finelypowdered leaves have also been administered to women immediately after delivery as a tonic to the uterus C. pulcherrima, Swartz, Fl. Br Ind, II, 255 Roxb, Fl Ind, 32 Ld CBC, 356 THE BARBADOS PRIDE Svn -- POINCIANA PULCHERRIMA, Linn Vern -Krishnachura, Beng, Sans, Rainagandi, Kan., Daungsob, Habitat -An introduced plant, commonly occurring in nearly every MEDICINE. medicine " dicine" (J. Cameron, Bangalore)

Domestic Uses—It is sacred to Siva Ink is made from the charred DOMESTIC. wood (7. Cameron, Bangalore) 34 C. Sappan, Linn , Fl Br Ind , II , 255 35 THE SAPPIN WOOD, SAMPFFN WOOD Vern -- Bakam, tairi, patang, Hind, Beng; Teri Santal, Bokmo, Uriya Patang URIVA Patang lakri, Duk , P ku, vartangı, TAM Bakamu akanu chekka, References -Roxb, Fl Ind , Ed CBC, 356, Bedd, Fl Sylv, 90, by Moore & Lindt , Wiesner, Rohstoffe, 555 Habitat -- A small thorny tree of the Eastern and Western Peninsula and Pegu and Tenasserim, cultivated in Central India Properties and Uses-Dye .- The and alde a at the and a DYE 36 This is also from the B yellow dye. mordant in Burma The pods are used in Monghyr, along with proto-sulphate of iron, to give a black colour Sappan (or bakam) wood is largely used in calico-C. 36

The Sappan wood,

CÆSALPINIA Sappan.

printing, its price being about R12 a cwt. Chips of the wood steeped in writer yield a red colour. This is intensified by alkalies. Combined with turneric and sulphate of iron, it gives the colour known as Kalejas (or liver-colour, "lit de-orn") With indugo it gives (sausni) purple. Sappan colour, however, is not permanent, being formed through the presence of the soluble substrace Brazilin. Tannin and alum are used as mordants

Dye-tincture.

mixed with ing colour kosh (sulp wide. In the case of the wood, it is either cut into pieces or pounded and then boiled in water from 5 to 8 hours; 12 chittacks of bakan wood

are boiled in 25 seers of water till 10 seers remain. The solution is put aside, and the same wood is again boiled in another 25 seers of water c

the necessary consistency and tint

into cold w-* -

Mr. Thomas Wardle, in his Report on the Dyes and Tans of India,

Chip.

(Surgeon-Major W Dymock, Bombay)

Medicine.—Ainslie says a decoction of the wood has the property of a powerful emmenagogue. The wood, though chiefly used as a dee, is described as a useful astringent, containing much tannic and gallic acids, and has been recommended by O Shaughnessy, and later by the

t is supposed mong native rding to Dr. Patna, p. 15) is prescribed Professor

author with of Sappan with potash, banum resin

with potash Sappan extract gives a larger yield than galbanum resin" (Pharmacographia, &c.)

Special Opinions—§ ""diarrhea," (Assistant Sur
"An excellent wool dye; it logwood It is useful in som and is given internally in dec.
Ross, Delhi) "Emmenagog

Gulai 39

MEDICINE.

Wood 40 12

CAJANUS indicus	The Pigeon Pea
TIMBER, 4I	Structure of the Wood —Sapwood white, heartwood red The wood takes a fine polish and does not warp or crack. Weight from 52 to 61 lbs per cubic foot Mr. J. Cameron reports that the lac insect has recently taken to this plant in Bangalore
42	Cæsalpınia sepiaria, Roxb , Fl Br. Ind , II , 256
LAC 43 TAN BARK 44 OUL OUT FOR MEDICINE 45 DOMESTIC 47	Vetn.—Urn, wif arth, relu kando, aila, Hind , Phulmai, uran (Jue Lah), kando (Kashmin), dodur (Chenad), relme didrian dhar ki karer, (Ravi) andi, arlei daghauri (Bias), onema (Suttip), PB Chillara or chilur Boms, Mar, Hossig, Kan, Sukyanbo, Burm References—Roxb, Fl Ind, Ed CB C, 337, Stemart Fb Pl 60 Brandis, For Fl, 150, Kurs, For Fl, Burm 1, 406, Gamble, Man Timb, 135 Habitat A local of the agency of the close by H-1 a, and extending to Gum—1 39) Tan—The bark is much used for tanning in the Konkan Oil—"The young pod contains an essential oil (Bomb Gas, XV, pt 1, 65) Medicine—In Chumba the bruised leaves are applied to burns—(Stewart) Domestic Uses—Makes an impenetrable fence, said to have been planted for this purpose by Hyder Ali round forthfied places (Stewart) The Chinese are said to use the seeds and pods of several space so Cassalpuna as soap nuts—This property does not appear to have been attributed to any of the species, wild or cultivated, in India CAJANUS, DC, Gen Pl, I, 541
49	historic The generic name Cajanus is derived from the Malayan name for the plant (Kaljang) Cajanus indicus, Spreng, Fl Br Ind, II, 217 Ploeon, No eye (small form) or Congo Pen (large form), Dal or Cadjan Pea Sym—Cyrisus Cajan, Linn; Cajanus indicus, Spr., C flavus, DC Ve
	References - Roxb, Fl. Ind. Fd. C.B.C., 5/7 Stewart : 1b Pl. 60; Raden Powell Pb. I. 1. 212 hurn For Fl. Ruem. 1. 217 Gamble.

References —Roeb, Fl. Ind. Fd. C.B.C., 5/7. Stewarts 1b. Pl. Cos. Baden Powell Pb. Ir. 1, 242. Kurs For Fl. Burm, I., 377. Gamble, Staw Timb. 133, Thwastes En. Ceyton Pl. 903. Modeen Sherilf Sulph Pharm. Ind., 81, U. C. Dutt. Mat. Med. Hind., 150, Drury's Us. Fl.,

The Pigeon Pea.	CAJANU
og Fide's Fad. Fam Fred. Peris Est. Cat. 72; Duthie and Fuller's full and Goden Cross of the N. F. and Onds. Part II, p. Add. Add. Part II, p. Add. Onds. Part II, p. Bal. Add. Part II, p. Bal. Part II, p. Bal. Part II, p. Bal. Part II, p. Bal. Habitat.—Latensis of which and Hroughout India even up to an altitude of Gover Icct. The Firea of Hintish India regards this bush as doubt ledly wild in India, and DeCandolle, in his Origin Gull. Fl., views it as twee probably a native of tropical Africa, introduced perhaps 3,000 years ago into Ind. A.	
Preferties and Uses— Medicine.—The pulse is said to be easily digested and therefore suitable for	PEDICINE.
dus Bhittathorjs, Chanda, Central Previncet.) "The pulse and leaves are rised and made into a paste, which is warmed and then applied over the mamme to check the recretion of milk," (Surgeon IV. A. Lee, Mangalers.) "The tender leaves are chew "quins," (Fingule Surgeon J. H. Thorpoultice made with its seeds will check.	
	FOOD. Seed. 51
Section of the sectio	
Cajanus indicus:—a large form confined to garden cultivation, known as spectively as wallada-ely cultivated in the ry is grown mostly as subordinate crop along with yuar, bayra, and cotton, but it is also, though	n,-W. P. 52
to a comparatively much smaller extent, grown by itself. Hence, when it is cultivated as a mixed crop, the soil on which it is grown requires equily to the necessities of est the heaviest, and when nosts soil is generally most its roots freely. About 6	<i></i>
$p_{i} : \omega \times C \to \mathbb{N}$	
of a higher yield than 7 maunds. The outlay on cultivation is about the same as that for millets. In the North-West Provinces it has been calculated that there are 351 C. 52	

• •	Distributely by the state of the
CAJANUS indicus.	The Pigeon Pea.
	Inkhs of acres on which this is cultivated as a joint crop, and perhaps 11 are under arhar solely. "It occupies the ground for a longer period than any other crop except sugarcane, being swan at the commercement of the rains, and not cut till the rab harvest time in March and April." It is cut with the rabi crops and allowed to be stacked on the threshing-floor until the threshing and cleaning of the former are completed. The leaves and pods are first of all strapped off the sterns and then beinged together, and the grain threshed out either by bullocks trending or by being beaten with a stick." "Frost is the principal enemy with which arhar has to contend. A single cold night often utterly runs the crops of a whole district, and in the following morning the cultivators may be seen sadd; cutting down the withered plants as fodder for their earlie. Its liability to damage is, however, greatly dependent on the strength of the plants, and hence the crop grown on maured land near the village site will often remuin green and flourishing after a frost which has withered up those on outlying fields." (Dutti is and Faller, Field and Gardin Cropt.)
c. p. 53	"A good deal of the is grown (in Nagpore); it is often raised in the same field as cotton, generally five rulges of cotton to one of the." (C. P. Gar., 32?.) "In Raipur two kinds of arhar or the are known, the small and early arhar called harond, and the larger and later kind called mith. Both are sown at the same time, but the former tipens about two months before the latter."
BOMBAY. 54	In Thána it is grown as an early crop in uplands, often with Elensiae corocana and Panicam miliaceum, and also as a dry-weather crop in late or rubs soil, and in the better rice-fields. Both crops ripen in about four months, the early in November and the late in February. (Bomb. Gas., XIII., 260.)
panjab. 55	According to Stewart, "The yellow and parti-coloured kinds are not uncommon, the one as a cold-weather and the other as a hot-weather crop in the enstern and central Panjib, and extend sparingly to the Transform
BENGAL 50	
	to Roxburgh, the former requires only three months to ripen its crop but yields only one hundred-fold, while the latter takes nine months, from sowing to ripening of seed, and yields about six hundred-fold. The former is sown in September and the latter in June The small form is known in Jamaica as the No-eye pea, and the large as the Congo pea.
	w.t., dis-
57	of mitrogen, starch, and oil contained in this pulse: Nitrogenous matter (albuminoids) Starch or carbonaceous matter Oil or fat 1 to be 1 12
	C. 57

Calabar Bean.

CALABAR hean.

of water, 3 oz. and 208 grains of albuminoids, and 9 oz and 11 grains of starch. According to Church the nutrient ratio of dal would be about 1:

3: the nutrient value 80. The reader will be enabled to compare the relative quantities of these constituents in other species of pulse from the following table :-

Name.	Nitrogenous matter	Starchy matter	Fatty or oily matter.
Cicer anclinum Cyamopsu sporaloides Dolichos bidnos Dolichos Labia Vigna Cattaing Ervam Lens Glycine Soja Lathyrus sativus Phaseolus Alungo Phaseolus Mungo Phaseolus Mungo Phaseolus Mungo Phaseolus Mungo Phaseolus Mungo Piasaohus Mungo Pisum sativum	18 o5 to 21 23 29 % o 23 47 22 45 to 24 55 24 50 to 25 52 400 24 57 to 26 18 37 74 to 41 34 31 50 23 54 to 24 70 22 43 to 24 70 22 43 to 25 20	60 11 to 63 62 52 89 61 02 to 61 85 60 52 to 60 81 59 02 59 34 to 59 96 29 54 to 31 08 54 26 60 78 59 38 to 60 36 62 15 61 90 to 64 32	4 II to 4 95 1 40 6 76 to 6 87 0 81 to 2 15 1 41 1 00 to 1 92 12 31 to 18 90 0 95 0 64 1 11 10 1'48 1 46 1 32 to 1 12

(Baden Powell, Paniab Products, I , 243)

Pent sens Ch. ch.

diarrhora or dyspepsia (Surgeon-Major It. in Dan, Min.). "It is difficult of digestion and very unsuited to people who are subject to acidity and heartburn I have always found it so " (Surgeon K D Ghose, Bankura.) Professor Church states that the irritant and

their appearance This practice is not unknown in reference to the which in the south of Europe" (Food-grains of India) May not this fact account ıgal, Ad.

FODDER. noxESTIC. 59

sides it is one of the best for producing hre by inction. remarks that "the stalks are used in the preparation of gun-powder in the Government works at Mazagon" (Bombay Products, 1862, f 1861, 7) Employed in the Bengal gun powder works for charcoal. (Balfour.)

Cajuput oil, see Melaleuca Leucadendron, Linn , MYRTICLE.

Calabar bean, see Physostigma venenosum, Balf , LEGIMINOSE

C. 59

basket-

сr

CALAMUS The Andamanese Calamus. andamanicus. CALABAR SKINS. Calabar Skins of Siberian Squirrel Skins. 60 Petitoris, Fr. : Granwerk, Germ. : VAOR VAIO, II.: HIELKA, Rui GRIS PEPUPNO, Sp. in considerable ed for caps, and See Sourcels. Also under Funs. CALAMANDER WOOD. Calamander Wood.—A beautiful kind of rose-wood obtained from Ceylon, the timber of Diospyros quasita, which see. 'nт Calambac, see Aguilaria Agallocha. CALAMUS, Linn.; Gen. Pl., III., 931. 60 ruminated The generic name Calamus is the Latin and the Greek Κάλαμος, a reed or cane. For a more general and popular account of the genus, see under " Canes." Calamus acanthospathus, Griff., Pl. exc., fig. 1; PALME. 63 Reference .- Gamble's Man. Timb., 423. Habitat. -- Khásia Hills. 64 C. andamanicus, Kurz, For Fl. Burm., IL, 519 Vern .- Chowdah, AND. References - Gamble, Man. Timb , 424 Habitat .- Met with in the Andamans. TIMBER. Structure of the Wood .- Dr. Kurz describes it as "an evergreen 65 lofty, scandent, rattan-palm, the sheathed stems being as thick as the arm and the canes up to an inch in diameter."

The Dragon's-Blood	CALAMI Draco
Calamus arborescens, Griff, Pl clxxxviii Veru.—Danoung, dankn or aanon, thing, syenbankyen, Burm References —Gamble, Man Timb, 423, Kurs, For Fl, Burm, II, 516 Habitat.—An erect, elegant cane, often stoloniferous, met with in Pegu	CANES 65
C. collinus, Griff., Pl clxxvi , Gamble, Man Timb , 423 Habitat —An erect cane, met with in the Khasia Hills and in Upper Assam.	67
C. (Dæmonorhops, Mart) Draco, Willd, Blume in Rumphia, II, / 131-32 The Dragon's Blood, Calamus Vern — Aprang, ranghharat, damlakwapi, dam-ul-akhwain, jaida rumi, hiradukhi, Hind, Hira, dakhan, hira-dukhi, Boms, Mar, Guj, nuliban, Richard Richard, Richard Richard, Richard Richard, Richard Richard, Richard R	68
his step-mother References — D. at. 17.7.7.7.7.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0	
dru annas to Rt per Pal Forest near Car The Dragon's blood of modern commerce comes chiefly from Borneo There are, however, two distinct forms of Dragon's blood—the	

Donate and the ancient

Properties and Uses—
Gum.—This gum is sold in dark red friable misses, from which a blood red provider is obtained. This is often met with in the bazar packed

blood red powder is obtained, this is often met with in the bazar packed in the interior of canes.

The fruits of C. Dece are clustered each covered with beautiful imbri-

The fruits of C Draco are clustered, each covered with beautiful imbincating scales, which are coated with a red resmous substance. The fruits are collected, placed in long bags, and violently shaken, the resmous

has been removed by heat and bruising. The third and most inferior appears to be the refuse of this last process. It is perhaps doubt-whether this article is procured from the plant by incisions.

Other species of Calamia also yield Dragon's blood, and from are soon.

Other species of Calamia also yield Dragon's-blood, and from inc sport on the stem a resmous substance resembling Dragon's-blood is obtained from Dracona Drago, a tree of the Little.cat and a native of the Canary Islands. A famous specimen of this tree, one often referred to by where it

C. 69

CUM

CALAMUS The Dragon's-Blood. Draco. CANES. on this subject, once existed at Oratava in Teneriffe, but it was unfortunately destroyed in the hurricane of 1867. The dragon's-blood afforded by this plant is met with as a secretion at the base of the leaves. A similar red gum is also said to be obtained from Pterocarpus Draco, a tree of the West Indies and South America, and also from Croton Draco, Schlecht. Varnish The various forms of Dragon's-blood are used in varnishing and staining wood. The substance is chiefly judged by the dealers according 70 to colour and the high percentage of resinous matter soluble in alcohol. It is of inferior quality when it gives a dull brick-red mark when rubbed on paper, or has an earthy look on fracture. Medicine -- DRAGON'S-BLOOD -- In the first mention we have of this MEDICINE. drug it is spoken of as exported to the East from Arabia and Socotra. 71 Ibn Batuta makes no mention of it as found in 1325 and 1349 in Java and Dawhaes a mine a trat enough of it are a mend Dragon's-blood of the ancients was a resmous entract from the stem of a Dracæna, and thus to have been a substance now treated as false Draand all he was much from the for the of a fighter a chiefly used as a colouring agent for plasters and tooth-powders. Special Opinions - 5 " Dracæna schizantha, Baker, yields Zanzibar Dragon's-blood; and D. Cinnabari, Socotnan Dragon's-blood," (Surgeon-Major W. Dymock, Bombay.) "The Burmese Kyeing-ne produces a red evudation like Dragon'sblood. Dr. Mason presumes this to be C Draco" (7. C. Hardinge, Rangoon) "Astringent, used as a dressing for ulcers." (Surgeon W Barren, Bhus, Cutch) Chemical Composition .- " Dragon's blood is a peculiar resin, which, 72 according to Johnston, answers to the formula Con H to O4 By heating acid liquid is obtained, together burning taste and crystals of e products has not yet been acetone, Toluol, C, H, (CH.). Styrol, C, H, (Draconyl), has to the existence in the drug of Both these hydrocarbons are lighter than water, jet we find that the above only portion yielded by dry distillation sinks in water—a circumstance possibly occasioned by

the presence of benzoic alcohol, C, H, (CH, OH).

The Rattan.

CALAMUS fasciculatus

"As benzoic acid is freely soluble '---' CANES, removed from the drug by that solven got traces of an amorphous red matte

nothing crystilline. Cinnamic acid, on the other hand, is always present, according to Hirschsohn (1877) As to the watery liquid, it assumes a blue colour on addition of perchloride of iron, whence it would appear to the colour of the colou

with nitric acid, benzoic, nitro-benzoic, stained, and only very little picne acid the drug with caustic potash, and found

have shown that none of the forms of Dragon's-blood which they examined contained benzoic acid. They, however, found cinnamic acid in the resins of Calamis Draco and of Dracena Cinnabari. They presume that the error of supposing the presence of benzoic acid arose through confounding it with cinnamic acid or possibly from working with a resin in which benzoic acid had been formed by partial oxidation. They established the chemical characters of four kinds of dragon's-blood, the origins of two of which were authentic, namely—

Dragon's-blood from Calamus Draco.—Is of a brick-red colour, melts at Co. grung off highly irritating fumes; is insoluble or nearly on a told caustic soda, ammona, lime water, and sodium carbonate, but dissolves when boiled in these reagents. It may be represented by the formula Co., Hill, Ob.

Dragon 5-blood from Dracana Cinnabari.—Is vermilion-coloured, melts at 80° C, giving off aromatic irritating fumes, is readily soluble in cold caustic soda, ammonia, lime-water, and sodium carbonate. It may be represented by the formula C₁₈ H₁₈ O₄ (Pharm Journ, 1883) This is probably the true dam-ul-akhwain of the Arabs, it occurs in tears covered with a dull-red powder.

Calamus erectus, Roxb, Fl. Ind., Ed C.B C, 719

Vern — Sungotta, SYLHET, Theing, thaing, BURM. References.— Kurs, For Fl, Burm, II, 516, Gamble, Man Timb, 423, Drury's Useful Plants of India, 97, Balfour, Cyclop

Habitat —An erect cane found in Sylher, Chittagong, and Pegu. Food.—It is said that in Sylhet the poor classes use the seed of this cane as a substitute for betel-nut.

C. extensus, Roxb, Fl. Ind, Ed CB.C, 720.

Vern.—Dengullar, Sylhet, Nelapoka, Tel.

References.—Gamble, Man Timb., 424; Drury's U P of India, 96.

Habitat.—Met with in Sylhet, and said to often attain a length of 600 id Manipur Hills for

C. fasciculatus, Roxb , Fl. Ind , Ed. C B.C , 721.

Vern.—Bara bet, Beng, Perambu, Mala, Tam; Amla, retasawmu, Tel.; Dutt gues Amburelasa? (== ratian growing in water) Sans, but Dr Oh Rice informs the autee that this determination is irrorrect,

C. 7

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73

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74 75

••	2 milenary by the 12.0month
CALAMU hypoleucu	
CANES.	and that the Sanskrit name of this species is more likely to be Vetra, Kyring Ma, Ayrata, Muras, References—Griffs, P. 1.155, A. & R., Reandis, For. Fl. 559; Gamble, Man. Timb., 431; Kwrs. For. Fl., Burm., 577; Balyour, Cycly., U. C. Dutt, Males, Med., Hind., 250.
	Habitat.—Met with on the plains and hills of Bengal, Orissa, Chitta-
DOMESTIC. 78	tt
79	Calamus flagellum, Griff.; Gamble, Alan. Timb., 423. Vetn.—Rabi bet, Nreat; Reen, Lercus; Nagagola bet, Ass. Habitat.—Met with in Sikkim and Assam.
80	C. floribundus, Griff., Pl. execii.; Gamble, Man. Timb., 423. Habitat.—Met with in Upper Assam.
8r	C. gracilis, Roxb., Pl., Ld. C.B.C., 721. Vera.—Mapiri bet, Beno.; Kraipang, Maon; Hundi bet, Azs. References.—Griffith, Pl. czeci.; Gamble, Slan, Timb., 232; Drurr, Useful Plants of India, 92; Kurs, For. Ft., Burm., 320; Thealtes, En., Cylon Pl., 320; Balfour, Cyclop. Habitat.—Met with in Assam, Chittagong, and South Ceylon.
82	C. grandis, Griff., Pl. cex.; Gamble, Man. Timb., 424; Kurz. II., 523.
٠.	Syn.—Demonorors grandis, Kurs (Enum., 30). Vern.—Réang sumambo, rolang chry, Malacca. Habitat.—Met with in Malacca and the Andaman Islands; stem about 2 inches in diameter.
83	C. Guruba, Mari. Vetn.—Kyeing-nee, kyesnni, Burm. References.—Gamble, Man Timb, 424; Kurs, For. Fl , Burm , 522. Habitat.—Met with in Chittagong and Burma.
84	C. Helferianus, Kurz, 11., 521 (Enum., 39); Gamble, 424. Habitat.—Met with in Tenasserim or the Andamans.
85	C. humilis, Roxb., Fl. Ind., Ed. C.B.C., 719. Reference.—G _{amble} , Man., Timb., 433. Habitat.—An erect cane of Chittagong.
86	C. hypoleucus, Kurz, For. Fl., Burm., II., 523. Syn.—Demonorors hypoleucus, Kurz (Enum , 27). Reference.—Gamble, Man. Timb , 424. Habitat.—Met with in Tenasserim.
	C. 86

	CALAMUS astersianus.
Calamus inermis, T. And.; Gamble, Man. Timb., 424. Vern.—Dangri bel, Nepal.; Brool, Lepena. Habitat.—Frequent in Sikkim and Bhután. Furnishes the finesi	CANES. 87
alpen-stocks. C. Jenkinsianus, Griff., Pl. elxxxvi. A., fig. 3; Gamble, Man. Timb, 424, & xxx.	88
Syn.—Cymospathes Jenkinstanus, Gamble. Vern.—Gola bet, Ass; Gallah, Cacinar. Habitat.—Met with in the Sikkim Terai, the Duars, and Assam.	
C. latifolius, Roxb, Fl. Ind, Ed. C.B.C., 719 Vern.—Korak bet, Chittagong; Sain, Magh.; Ya-ma-ta, Burm. References.—Griffith, Palms, Br. Ind., 69, Pl. excent; Brandis, For Fl. 560; Gamble, Man. Timb., 443, 444; Kurt. For. Fl. Burm., 518.	89
Habitat.—Met with in Chittagong, Burma, and the Andamans, Structure of the Wood.—This cane is much used in Burma for tying timber in rafts, and making the cables which stretch across the river at the Salween rope station. An immense climber, with the stems about as thick as a walking-cane.	
C. leptospadix, Griff, Pl. lexeiv. A., Gamble, Man. Timb, 423. Vern.—Dongri Sef, Nepat; Lat, Lepcha. Habitat.—Found in Sikkim and the Khásia Hills.	91
C. longipes, Gr. ff., cc.u. A & B.; Gamble, Ma . Timb, 424 Vern.—Gola bet, Sunderbunds Habitat.—Dr. King has identified this plant, proving the existence in India of a species hitherto supposed to be confined to Malacca.	92
C. longisetus, Griff., Palms, Br. Ind., 44, Pl. clxxxix. A.; Thwaites, En. Ceylon, Pl. 330 Habitat.—An erect palm, very much resembling C. arborescens; met with in Pegu and Ceylon	1
C. macracanthus, T. And ; Gamble, Man Timb , 424. Vern.—Phekors bet, NEPAL; Ruebee, greem, LEPCHA.	94
C. macrocarpus, Griff, Pl. clxxx VI. A., figs 1 & 2; Gamble, Man Timb, 423. Syn.—C Execus, Roxb Habutat.—An erect cane, met with in the Bhután Duars,	95
C. Mastersianus, Griff, Pl ecvi.; Gamble, Man Timb, 424. Sym.—C. Guruba, Kurs. Vetti.—Sud-bet, quab bet, Ass. Habitat.—Met with in Assam, and, according to Griffith, is the	96
smallest cane in Assam, being less than half an inch in diameter C. 96	l

CALAMUS .

Rotang.	The Rattan.
CANES. 97	Calamus mishmiensis, Griff.; Gamble, Man. Timb., 423. Habitat.—Met with in the Mishmi Hills.
98	C. montanus, T. And.; Gamble, Man. Timb., 424. Vern.—Gouri-bet, Neval; Rue, Lepona. Habitat.—Found in Sikkim and Bhután. Yields the best cane for suspension-bridges; used also in Sikkim for dragging logs.
99	C. nutantiflorus, Griff., Pl. ceviii. Gamble, Man. Timb., 424. Habitat.—Met with in Assam.
100	C. palustris, Griff. Syn.—C. Latifolius, Kurz, ii., 518 (Enum., 34). Habitat.—Met with in Mergui.
101	C. paradoxus, Kurz, ii., 521 (Enum., 40). Reference.—Gamble, blan. Timb., 424. Habitat.—Met with in Martaban.
102	C. polygamus, Roxb., Fl. Ind., Ed. C.B.C., 721. Vern.—Hiddm, CHITTAGONO, Reference.—Camble, Man. Timb., 423. Habitat.—Met with in Chittagong.
103	C. quinquenervius, Roxb., Fl. Ind., Ed. C.B.C., 720. Vern.—Hurnur, gullar, Syther. Reference.—Gamble, Man. Timb., 424. Habitat.—Met with in Sylhet.
104	C. Rotang, Linn. (in part); Roxb., Fl. Ind., Ed. C.B.C., 720. THE RATTAN CANE.
3	Syn.—C. Roxburghtt, Griff. It seems probable that C. Rotang, Linn, included originally more than one species tellowing Marilus; it is desirable, therefore, to retain the name as restricted to this species. C. Rotang, Wille, as in Roxb., Flora India, is the plant here described. He presumed that the Indian form was the same as Linnæus Rotang,
	V-
	The generic name in Ceylon for Calamus is waiwel, Singh. References.—Griffith, Pl. exii., B. J. T. Timb., 423; U. C. Dutt, Mat. Med Drugs, 145; Drugs's U. Pl., 66; Dispens, 15th Ed., 1636; Balfour, 67c.
	Habitat.—Met with in Bengal, Assam, South India, Burma, and in the hotter parts of Ceylon. It delights in rich, moist soil, where there are bushes and trees for it to climb on, (Roxb) It flowers at the beginning of the rains and ripens during the cold season.

The Rattan.	calamus tenuis.
Fibre —This is the species which yields the best and stoutest rattan canes of commerce. Other species are, however, used as substitutes. It is split into strips and platted or woven into baskets, chairs, sofas, and carriages. It is made into ropes, or is stretched entire across rivers, as the main supports of cane suspension-bridges. For further information see Canes.	CANES FIBRE. 105
Food—It flowers during the rains, and the fruit, which ripens in the cold season, consists of a fleshy substance surrounding the seed. This fleshy substance is eaten by the natives, who also eat the young tender shoots, regarding them as a delicacy.	F00D 106
Calamus Roxburghu, Griff, Palms, Br Ind, 55, Pl exu Syn —C Rotang, Roxb (non Linn) Fl Ind, 720, Thwaites, En Ceylon Pl, 330	107
See C. Retang, Linn, above. C. Royleanus, Griff, Pl. cate Syn—C Rotang Linn in fast References—Brandis, For Fl., 559 Gamble Van Timb, 423 Drur), Us Pl. 67	108
Habitat —Met with in Dehra Dun and in Northern Bengal C. rudentum, Lour Vern —Ma maiwel, Singh	109
References —Resb., FI. Ind., Ed. C. B. C., 719 Habitat —A native of the Malaya and of Ceylon Fibre —Dr. Trimen writes that this species is used by the people of Ceylon for ropes. "It is split into strings and used for platting beds, chairs, baskets. Long ratians are also employed for bridges across streams and rivulets."	FIBRE. IIO
C schizospathus, Griff ; Gamble, Man Timb, 423 Vern - Rong, Lepcha	III
Habitat.—An erect cane, native of Sikkim and the khássa Hills Structure of the Wood —Stem about 2 inches in diameter, with hard wood and closely packed fibro-ascular bundles.	TIMBER. 112
C. Scipionum, Lour, Brandis For Fl, 560 The Malacca Cane (See also under Canes) Habitat.—A native of Sumatra and Cochin China. The canes are largely imported into India, after having been smoked.	113
a process which gives them their beautiful brown colour	
Calamus, Sweet, see Andropogon Schananthus, A. 1117 C. tenuis, Kozh, Fl. Ind., Ed. C.B. C., 721 Syn.—C. Monoicus, Kozh, R. Ind., Ed. C.B. C., 721 Vern.—Pendhari bet, Chittagova; Aring, Machi.; Yalia bet, Ani.; Yalia References.—Griffit, Fl. excis. A., F., & G., Frandit Fir. Fl. esp. Gamba, Jian Timb., 421, Gazz., Amer, For. F., Barrin, 422. Ikani et En. Cylon Fl., 332. Habitat.—A monocacous chimb ng cane, met mith in Arsara, Sylvet.	IIţ
Chittagong, Pegu, and in the hotter parts of Ceylon C. 114	

24

Calf-skins.

Calf-skins.

115 C

Calamus tigrinus, Kurz, For. Fl., Burm., 519.

Vern.—Leme, Burm ; Amdah, AND. Reference.—Gamble, Man. Timb , 424.

Habitat.—Found in Burma and the Andamans.

The Vernacular names given to Canes sent to the Paris Exhibition, the scientific names of which have not been determined.

Persons who have the opportunity of doing so may find it possible to

jayat and golak; the first is

CALAVANCE.

116

Calavance.—Ocionel Yule tells us that this name was once in common use in English, and may, perhaps, to this day be used at sea for a kind of bean, perhaps the Indian Vigna Catlang, or a species of Phaseolus The word comes from the Spanish garbaneos, which DeCandolle says is the Castilian name for Cicer arietinum (gram). See DeCandolle's Origin Cult. Plants, p. 323.

Calcium, see under Lime; also Marble and Limestone.

CALENDULA, Linn., Gen. Pl, II, 454.

117

Calendula officinalis, Linn.; Fl. Br. Ind , III., 357; Bot. Mag , t. 3204; Compositæ.

MARIGOLD.

Vern .- Aklel-ul-mulk, sergul, saldbargh, PB ; Htat-ta-ya, BURM.

"Aklel-ul-mulk is Astragalus hamosus, a leguminous plant." (Assistant Surgeon Sakharam Arjun Ravat, L M., Girgaum, Bombay)

References .- Stewart, Panjáb Plants, 123, Balfour, Cyclop.

Habitat.—Found in the fields of the Panjab and Sind, scarcely indigenous, Peshawar. (Attchison) Stewart says it is called zergul in the Trans-Indus tracts, where it is "common, wild in some parts" Dye.—An extract of the flowers is, by Bellew, said to be used to colour

DYE.

Dys.—An extract of the flowers is, by Bellew, said to be used to colour butter and cheese It is probable that some of the properties assigned to this plant should more correctly be attributed to the genda, Tagetes patula. Both plants are used as dyes and are often mistaken the one for the other.

OIL 110 FODDER, 120

Oil.—Baden Powell, in his Panjáb Products, mentions this as an oilyielding plant. The oil is said to be used for medicinal purposes. Fodder.—Bellew mentions the belief that when browsed on by cows, this plant is supposed to increase the flow of milk.

Calf-skins, see HIDES AND SKINS

Calicos or Calicut Cotton Goods.

CALICO.

CALICO

Calico. Cotton cloth originally made at Calicut.

Vera.—Kapra, Hino.; Tuni, Tam.; Gudha, Tel.; Kapin-kapas, Malay.

The earlier writers speak of the cotton fabrics of India as "linens."

When introduced to modern Europe they received the name of Calicos, after the town of Calicut, in the Madras Presidency, where they were then extensively made. At first the use of cotton fabrics was problisted in England, the downfall of the trade in woollen goods being anticipated from the introduction of these cheaper textiles. Soon, however, this opposition was removed; but instead of the centres of woollen manufacture be-

cotton manufacture been attempted in the more midland and eastern counties of England, it may be doubted how far the unprecedented success which rapidly ensued could have occurred. The time-honoured handloomed

year by year, was made ce of the Indian weaver

from India to Lancashire The exports from India, which once alarmed the British manufacturer, came to a sudden end. The tide turned, and wave by wave the imports from Great Britain increased until the cotton piece goods and yarns of Lancashire took complete possession of the Indian market.

goods and yarns But indications at

The target over-compension has in the given print in many cases to a depreciated article, and not in India only has the outery gone forth against the weighted and starched piece goods which now leave the shores of Europe for the foreign markets. This want of confident has recalled into new evistence the hand-looms of India, and the weavers using the European yarns are now turning out an article which, it is admitted on all hands, may be less elegantly finished but is certainly not inferior in quality to the imported piece goods. This demand for yarns has enabled first one then another cotton mill to spring into life and activity. There are now cotton mills scattered all over India, keenly compening not in the yart trade only, but in the piece goods as well, and list

saving of two freights may yet work the same revolution in the cotton trade of India as has become an established principle in jute. For further information see Cotton and Gossypium.

CALICOPTERIS.

Calicopteris floribunda, Lam ; COMBRETACEE.

Syn. - Getonia floribunda, Roxb , Fl Ind , 11 , 428. Veru. - Kokoranj, C P , Bandi, murududu, Tel ; Marsada, boli, Mysore.

C. 122

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•		* 1		
CALOPHY toment		The Poor	n Spar	
тімвея. 153	ter of the Fore	the Wood —Similar est Department says I rafters, and sometin to 40 lbs a cubic for	it is used largely nes in small boat-l	y in Chittagong fo
154	Calophyllum s	pectabile, Willd	, Il Br Ind, 1	, 271 , Wight, Ic
	VernPa	Moonii, Wight, C am anta ka, kyandoo, Bur huni in Hino is — Roxb, Fl Ind, Ei mble, Man Timb, 25, XII	M , Dokar tálada, A	AND , said to be know
TIMBER,	Habitat —A Islands	tall evergreen tree	of Tenasserim	and the Andamas
155	hard Is used for it has lately been	the Wood —Light re or masts and spars, or employed in building	also for planking ig barracks in the	g, for which purpose Andamans
156		n, W <i>ight, Ic, t 110</i> Poon Spar, Sirpoo		I , 274
	Vern — Pid Siri pune Reference: Dymock Oils and 1392 Ba Habitat — feet, met with southward, a Property a	BLATUM, Beddome, XX in sirpon Bosts, Pi kuce, surponne obbi, s —Gamble, Man Tri Mat Med, IV Ind, 2 Oil seeds 33, Lisboa, ilfour, Cyclop, Ed 1882 ind Uses—	in pane, pungu M KAN, Nagani, MA nb, 26, Theades, nd Ed, 87; Drury, Uz Pl of Bomb, i, Treasury of Bolar	En Ceylon Pl. 51, Us. Pl., 98, Cooke, 13; Spons, Encyclop, 14, 150 nára
вим 157	Gum — Dr E opaque gum, wh	dymock informs the lich, in the bazar, occurred and an end in	urs much mixed w	The solution is
	apparently some	of the brown colour	£ :	lighter in 'um in this id restored found that it the violet
oil 158 Timber, 159	The gum itself of spirit (Lyon) applied to any if the natives, it is medicinal virtues tel.	dution of the gum does communicates only a I am not aware of idustrial or medicina probable that they ar " (Dymock Mat M	very faint fluores either of these gu I uses, but as they e supposed by the ed, W Ind, 2nd sbundance of oil that of C spects	weence to rectified ums having been y are collected by em to have some Ed, 87-88) known as Keenaabile. This tree
	C ***	•		· · · · · · · · · · · · · · · · · · ·

The Swallow-worts

CALOTROPIS

o'ten fetch large prices. The timber is also used for building arbridge-work. A single tree his been known to realize more than £100 (R1,000). (Bomb Gas., XV., 64)	1
Calophyllum Walkeri, Wight, Ic, t. 45; Fl. Br., Ind , I., 275.	160
Syn.—C. Decipiers, Wight, III, i, 128. References.—Throuter, En. Ceylon Pl, 51; Cooke, Oils and Oil-seeds, 32 Ballowr, Cyclop.	,
Habitat.—A large tree, found in South India and Ceylon. Oil.—The seeds yield an oil, used for burning.	OIL.
C. Wightianum, Wall; Fl. Br. Ind., I. 274; Beddome, Flore Sylvat, 1 90; Wight's Ill. I, 128, also R. 1, 106.	161 162
Syn.—C spurium, Chois, and of Drury, Us Pl; C. decipiens, Wight	-
Vern.—Kalpan, kull-panne, bobbs, KAR ; Cheru pinnay, putengi, TAM	-
	;
Cooke, Gums and Gum-ressns, 109; Cooke, Oils and Oil-seeds, 33, Lisboa Us Pl of Bomb, 12, 214; Spons, Encyclop, 1370, 1381, 1624, 1683, 2020, 2021; Ballour, Cyclop, 4d, 1885, Treasury of Bolany	
HabitatAn evergreen tree of the Western Ghâts, from the Kon-	.)
kan to Travancore. Gum.—"The gum occurs in large, translucent, irregular lumps of a	GUM. 163
and becomes slightly viscid " (Dymock, Mat. Med., W Ind) Oil.—The seeds yield an oil not differing very much from that of C.	OIL
25, says that the resolutive, and s a medicine in l with honey in	medicine.
scables and rheumatism Food.—The fruit, when ripe, is red and sweet It is eaten by the natives (Drury) Structure of the Wood.—Hard, red Beddome and also Lisboa say the timber is in Kánara much esteemed, and is valuable for engineering	766
purposes	107
Calosanthes indica, Blume, see Oroxylon indicum, Vent., BIGNONIACEE.	
CALOTROPIS, R. Br.; Gen. Pl, II., 754. THE SWALLOW-WORTS	168
A - t A	
Leaves opposite, broad, or sub-racemose cymes : 5, fleshy, laterally com-	

34

gigantea.

The Swallow-worts

Calotropis Acia, Ham , Asclepiadez,

169

Syn.—Asclepias Herbacea, Roxb., Fl. Ind., Ed. C.B.C., 258.

Habitat .- A form met with in Eastern Bengal and Sikkim, having

petiolate leaves, the blade tapering into the petiole and with a globular corolla-tube.

This is much less known than either of the following species, and no

particulars of its properties and uses are available.

170

C. gigantea, R. Br.; Fl. Br. Ind, IV., 17; Wight, Ill., 1. 155, 156 A.
Sya.—Asclepias Gigantea, Willd.

Vern .- Bladdr, ak, ag, urk, akond, ákan, mudhár, safed-ák, Hind.;

References.—Roth, Fl. Ind., Ed., C.B.C., 251; Wight, Contri, Bolany, India, 53; Brands, For. Fl., 331; Kura, For. Fl., Burm., II., 269; For. Fl., Burm., III., 269; For. Fl., Burm., III.,

1595 ; Hooker, Him Your , 1 , 60; U. C. Dutt, Mat atea , 111mm 195; Beng. 512, Basas Dispe Bled Bomb Drue , 310; Atkir enral. 56 ; L Romb . Official

Habitat.—An erect, spreading, perennial shrub, chiefly frequenting waste lands. It ascends to 3,000 feet on the Himályay and extends from the Panjáb to South India, Assam, Ceylon, and Singapore, and is common.

Ve fin the leaves, which were used in sacringual rites. From one of the sansam names of the plant, namely, Mandara (according to Dr. Ch. Rice), "Madár is a plant, namely, Mandara (according to Dr. Ch. Rice), "Madár is a constant of sacrific."

Madár Gutta-percha,

CALOTROPIS gigantea.

Mir Muhammad Husain notices three kinds,-ist, a large form with white flowers, large leaves, and much milky juice, found near towns; 2nd, a form with smaller leaves and flowers, white on the outside but lilac within: and 3rd, a still smaller kind with pale greenish-yellow flowers (Dymock) The 1st and 2nd are most probably forms of C. gigantea, and the 3rd, O. procera

GUTTA: PERCHA.

pias gigantea. Robert Brown subsequently showed that it was incorrect to refer this plant to Asclepias, and he accordingly founded the genus Calotropis,-a genus which embraces, as far as at present known, two or probably three species. C. procera was first described from a specimen collected in Egypt by Prosper Alpinus (1580-84), and figured by him on his return to Italy (De Plantis Ægypti, 1592) It is also the Apocynum synacum figured by Clusms. (Fluck. & Hanb, Phar-

The drug prepared from one or other of these species was apparently well known to the Arabians. Ibn Baytar (Sontheimer's translation in 1842) describes the drug. Muhammadan writers at the present day refer to it under its Arabic name Ushar, in Persian it is known as Khark, The medicinal properties were first made known to Europe in 1826

A tradition of Oomarcote narrates that the great Emperor Akbar was born under an Ak bush; hence his name. (Birdwood) The word bar is applied to the liquor said to be prepared from Ak juice.

Properties and Uses—

The SAP yields a form of Gutta-percha; it is also used as a TAN and Dye a Manna is said to exude from the plant, the bast PIBRE and PLOSS from the seeds are well-known fibres; the ROOT bark and SAP are uce, the

plant are

THE MILKY SAP-A SOURCE OF GUTTA-PFRCHA.

MILKY SAP. Gutta-percha. 171

mer Dr

the other, it has been thought advisable to give in one place a compilation of the entire literature It is probable, however, that Dr. Riddell's experiments were entirely conducted with C. process and not with C. gigantea

The inspissated and sun-dried milky sap from the stem constitutes the

the first instance, by Captain (since Colonel) Meadows Taylor in a letter to the Secretary, Agri-Horticultural Society of India, Vol. VIII. Afterwards Dr. Riddell republished his discovery in The Bombay Times in 1852. As these letters may not be accessible to persons likely to be

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:/	rro	TRO	OPI	s
2	giga	ante	ea.	

The Swallow-worts.

GUTTA-PERCHA. interested by this subject, the more important parts narrating the actual experiments are quoted below:—

The second of th

L'a - - I marl at N/a -

water with a wooden kineager, or bonca, crinici process series to remove an actaproperty of the juice, as also all other matter but the gutta-percha itself. It is believed that the more it is boiled and worked up, the harder it will eventually become when cool.

Spirit of informatic—dissolves it into a viscin gine which, when taken up between the finger and thumb, pressed together, and then separated, shows numberless minute and separate threads.

"The above chemical tests correspond exactly with the established results of the real gutta-percha.
"The substance, however hard it was to be about the results of the real gutta-perchange in the results of the real gutta-perchange in the real gutta-perch

"The substance, however hard it may have become, becomes immediately flexable in hot water, and readily takes any form required, receiving and retaining impressions of seals, ornaments, &c. It has been made into small cups and other vessels which are not found to after in form.

Dr. Riddell subsequently wrote :-

"As regards my experiments with the 'muddar' juice, they are as follows: Having collected about 18 fluid ounces, I had it strained through a cloth, and exposed 150 ounces of it to solar exporation on a flat dish. In three days it became firm separating itself from the dish and easily removed. I then placed it in boiling water,

Madár Gutta-percha.

CALOTROPIS gigantea.

OUTTA-

Mr. Llotard publishes, in his "Memorandum on the materials in India suitable for the Manufacture of Paper," the opinion of Professor Redwood upon Madár-gutta The Professor considers it possesses many properties in common with Gutta-percha of commerce The specimen so reported on was collected by Oaptain G. E. Hollings, Deputy Commissioner, Shahpur (in the Panjáb) in the year 1853, little more than one year after

ADAR-LBAN. 172

mercal importance. Colonel D. G. Pitcher, Lucknow.) Dr. Duncan in 1829 discovered in Madár-guita a substance which he called Mudarine. This was said to have the property of coagulating by heat and becoming again fluid with cold. This statement has never been confirmed, but Dr. Warden published, in 1885, his discovery of a white crystalline mass closely resembling the substance named Alban by Payen. This Dr. Warden named madár-alban A yellow resin associated with the madár-alban was found to agree with Payen's Fluant as found in true guita-percha. Speaking of these discoveries Dr. Dymock says "The fact that the sap of the madár plant contains, in addition to caoutchouc, two

the Drug)

writers? (See page 47)

"A warmsh-like Exudation.—Some time ago the writer observed the departs in Chutta Nagpur completely covered with multitudes of small green insects. The bushes did not look over-healthy, and (apparently as a result of the action of the insects) a gummy liquid exuded from them and trackled down to the ground below. The writer was travelling in company with Sir Monner Williams and one or two other gentlemen, so that this curious discovery was investigated by several persons, none of whom had ever observed the peculiaruly alluded to before, although many years resident in the district. We were crossing the dry sandy basin of the Upper Brafkar, and our attention was drawn to this curious fact by the ground under the bushes appearing wet. Stones were picked up but found to be quite dry, although completely varished with the liquid falling from the bushes. The author is not aware of this varishle to investigate its chemical nature. May it not, however, be in some wiy connected with the exercition of mannal described by Araban and Pers an

VARNISH. 173 CALOTROPIS gigantea.

The Swallow-worts.

TAN. Dye. 174

Tue Dyr.

Dye.—The milky sap is well known in tanning. It is made into a paste with the flour of the small previously to colouring the skin wi colour to the skin, and destroys the Dymoel.

sam. refers, said to adulterate safflower with the powdered flour of the root.

THE MADIR FIBRES.

FIBRE. Floss. 175 Fibre.—This plant, as also the next species, yields two distinct fibres of a silk cotton from the seeds known commercially as "Madár floss;" and (2) a rich white bast fibre from the bark.

x The Floss as a Textile Fibre.—The coma of hairs or floss from the seed constitutes one of the so-called (see under Bombax malabaricum).

given to children, and to fever patients, having a reputation of being

the seed-pod." [This may be presumed to mean the floss of the seeds from the follicles.—G.W.] No efforts appear to have been made in India to improve the quality of the madar floss, although there would seem to be no reason why, under careful cultivation and selection, the length of the staple might not be greatly improved. In Spons Emprebadra occurs the following passage regarding this floss: "It is said to be sometimes woven into shawls and handkerchiefs, and to form a good paper-stock." The fibre, being short, was found by Mr. Moneton very difficult to spin, but when a mirture of one fifth of cotton was made, a good wearing cloth, capable of being washed and dyed, was produced. (Royle) Kurz, in his Forest Flora of British Burma, says that strong ropes are made of this fibre. In Mr. Llotard's "Memorandum on Materials suitable for the Manufacture of Paper," the hope is held out that Messrs. Thresher and

to the shortness of the fibre and its extreme lightness they were forced to the conclusion that "it was practically useless," As opposed to the vertice Mr. Hollins recently informed the author that he had at last fairly overcome the difficulty of shortness of staple and lightness in weight. He had invented a machine which drew the flors mechanically into combination with cotton. The resulting yarn, Mr. Hollins states, has many advantages and peculiarities not possessed by cotton or wool alone, and he is thus now prepared to take steps to establish a large and important industry in this beautiful floss. (See page 41)

Bast Fibre. C	ALOTROPIS gigantea.
The Floss as a Paper-Fibre — using this silk cotton as a paper with the silk cotton was the silk cotton as a pare lakely to quite otherwise remunerative present every real account, its cull stem is one of them.	FIBRE. Floss. 176
at the present day. The Park I was a state of the state of the Madar were cut about 12 or 18 inches in length; the outer bark was then carefully peeled off, and the fibre picked from the inner part of it. Several threads were the placed side by side, and twisted into a twine by rubbing them between the hands. No water is used (indeed, is injurous); excrything is done by manipulation. In a subsequent paper Oaptain (afterwards in other reports Major) Hollings observes that the best plan is to select the straightest branches, which are that the dest plan is to select the straightest branches, which are the straightest branches and the straightest branches are the straightest branches, which are the straightest branches are the straightest branche	
	1
nearly forty years ago), very little has been done to extend our knowledge of the separation of the separation and examination of sound more particularly the opinion he has now arrived at regarding madar bast fibre;— "In the autumn of 1884, while testing different machines in their power of extracting the fibres of warous fibre-yielding plants, I devoted attention to the dhunda or madar amongst other plants. I had already studied this shrub previously, to a certain extent, and had formed a hope CC. 1777	

CALOTROPIS gigantea.

The Swallow-worts

FIBRE

ful idea of it. But the trials last alluded to have induced me to after considerably my previous opinion. I can now confidently state that the hopes expressed by previous a riters, and by misself, that the madir would be one of the best fibre-producers of this country, will rever be realized Its fibre is certainly line, strong, white, and niky, and could it while s be extracted in a merchantable could from (though none of the machines tested by me produced any good results with it; but the obstacles to its profitable utilisation on a large scale outweigh its natural good qualities.

Without entering into many details, I may mention two of the chief

obstreles ..

"(1) the very small proportion of the fibre to weight of the stems, the

proportion being only 1.56 per cent; and
"(2) the shortness of the fibres, extending as they usually do from joint to joint, the joints being from 3 to 6 inches apart.

"These two chief obstacles are sufficient to justify a withdrawal of the madar from the list of hopeful fibre-bearing plants of India. I have been considering the fibre in connection with textiles and strings; and it follows that it would be still less suited as a material for making paper, for in the manufacture of paper a material is required which, besides possessing tennetty, fineness, and purity, has also the advantage of cherpness Madur, owing to its very small proportion of fibre, and to the presence of a milk of a dangerous nature (both of which facts must necessarily raise the cost of extraction of the fibre), can never be utilised profitably as a paper material to any extent, and should, in my opinion, be considered as one of the last materials to which a paper manufacturer would have recourse "

A verdict so decisive and pronounced by a gentleman who has devoted much time to the study of ladian fibres should be gainsaid with caution, but opinions differ very considerably as to the prospects of madar bast fibre becoming of commercial importance. The attempts made by manufacturers hitherto would seem not to have been conducted on a sufficiently extended scale to systify the expression of strong expectations or to

dispel such hopes. The recent experiments conducted by the author in conjunction with Mr. Oross of I incoln's Inn, London, have resealed the fact that by nitrating the fibre a substance, which can scarcely be distinguished from silk, may be produced. This, in the first stage of its preparation, is an admirable gun-cotton, but its explosive nature may be destroyed without injuring the beauty of the texture. Under chemical treatment the fibre behaves admirably, and with different reagents various results are obtained, but it may be concluded that the opinion we arrived at confirms the verdict already given that the mechanical difficulties are too great and the ultimate fibriles too short to justify high hopes being entertained of madar bast fibre becoming of any great commercial importance, although its great beauty makes one resign it with regret

Strength of Madar. The comparative strength of madar fibre has been repeatedly shown, and the following table contains the results of the

experiments made by Dr Wight -

Name of the fibre.									Weight in B the fibre can sustain		
The fibre of Cocos nucifera Hibiscus cannabinus Sansviera zeylanica Gossypium herbaceum			:	:	:	:	٠	224 290 316 346	#b		
Agave americana Crotalana juncea Calotropis gigantea		:	:	:	:	:		302 407 552	» "		

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Cultivation of Madar.

CALOTROPIS gigantea

Of the fibres experimented with by Wight, the madár was by far the

strongest.

Madár bast fibre as a paper material.—Mr. G. W. Strettell, of the Porest Department, in his New Source of Revenue for India, states that the most reliable to make all for paper as good as and about

PAPER.

tha.

of difficulty of extraction In the Kew Report for 1881, however, an opinion is expressed by Mr. Routledge quite opposed to this, he believes that "neither it (madár) nor any other exogenous plant of similar character can ever compete with Esparto, nor be produced at a sufficiently low cost to admit of its being employed as paper-making material." With Esparto selling at £a ton, landed in London, it is hopeless to look to this for indeed to any fibre which requires to be prepared) to ever become an article of export trade for the English paper market. It may, however, come to be of some use as an Indian paper fibre. Paper is reported to be in fact prepared from it in the following districts Bellary in Madras, and Furruckabad and Meerut in the North Western Provinces [Colonel Pitcher throws doubt upon the accuracy of this last statement] The plant is abundant in the Panjáb, and, together with the next species, is there, to a small extent, made into paper

Cultivation of the Madar Plant for its Bast Fibre and Floss .- "It thrives

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raised from seed, it is said by some to require two years before

raised from seed, it is said by some to require two years before being ready for cutting, but if cut close to the ground, it grows again rapidly, yielding a second crop within 12 months from the first " (Spons' Encyclop') Royle's account of this fibre is the most complete statement published.

.. .

anything less productive than dry sand, and yet the madår thrives on it. Should its cotton be found useful, the waste lands of India could be covered with it, as it requires no culture and no water. It comes to maturity in a year, but is perennial, when once planted or sown, it would require no further care, poor s

root a

suggested that the madár should be used as a hedge to protect desert land brought under cultivation from the encroachment of drift sand This would give a healthful impetus to the cultivation of the plant itself."

(Royle, Fibrous Plants, 308) (For further particulars see Sand-Binding Plants)

Since the above was set up in proof the author has had many opportunities, in connection with the late Colonial and Indian Exhibition, held in

CALOT	ROPIS
rima	nter

The Swallow world

MEDICINE.

tumben, to demine who minufactions the progress of melle for. A Lancabete spones stand that he had now eight by the considered of foil or effected by the fire, in two properties in his a my quietry. Hence a will plant colored over a will near a the condition to the and derivate. The quiet color fover a will near a the condition for the first. The spones referred to, arting upon a might be made that has plant a small summed or easy in the histolicita. A state or symmetry, and a few across that have expensive melly be up the vin mode than before the first first has been most or origing, and the hope is earth fer four that by confident for the near the origing, and the hope is earth fer four that by confident for the sense of the deal and a latent minute minute that he character of the first may be charged and a length of staple improved. It is therefore the first may be considered when the than a first or many that and the different had a minute first. Me. Cameron of Mysice with the hardest that a much his records attending the first flows, Messey. Collype & Oct. [Oct. of offering files.]

MEDICINAL PROPERTIES.

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Chemical Properties.—Much difference of opinion util preva lenguate ing the relative medicard values of Cogigantes and Copeners. Dr. Wieht and with 1 in the majority of a the relative data deciden lastice of the latter, but all agree that the difference consists only in degree. The active principle seems to reside in a pecular butter principle, but no alkabed to curs in the drug. The able authors of the Pharmac graphia carefully respectioned.

duced colourless. Since the date of these experiments, Drs. Warden and Wellshife Community of the control of th

Bark. 182

Hindú writers seem to prefer the root-bark, and Muhammadans the juice. The Pharmacopana further directs that the roots should be collected in

Madár as a Drug.

CALOTROPIS gigantea.

April and May from plants grown in sandy soil; after carefully washing, to remove all earth and sand, they should be allowed to slowly dry in the shade until the sap no more flows from incisions made in the bark. The bark should then be carefully removed, dried, and reduced to a powder, and preserved in well-corked bottles. Moodeen Sheriff adds that the roots

from old are superior to those from young plants.

"The root bark is said to promote the secretions, and to be useful in skin diseases, enlargements of the abdominal viscera, intestinal worms, cough, accites, annurca, Ac. The milky juice is regarded as a drastic in combination with

appetite." "The land loss of so that the fu ٠. . with whey in a . . 11 12 15 15 1 root-bark, red of the legs and scrotum. The milky juice of this plant and of Euphorbia

neriifolia are made into 'tents' with the powdered wood of Berberis asiatica, and introduced into sinuses and fistula in ano." (U. C. Dutt, Mat. Med. of the Hindus.) According to Dr. Casanora, madar stimulates the capillaries and acts

powerfully on the skin, and is accordingly recommended as a remedy in the obstinate cutaneous diseases of tropical climates, such as elephantiasis and leprosy.

The Pharmacot cal comions held r are testified to by Durand, Stewari,

leprosy by Drs. Robinson, Playfair, Ross, Ainslie, Rogers, and Irvine. Its efficacy in syphilitic affections by Dr. Casanora, and in dysentery by Dr. Durand. In another paragraph will be found a most interesting series of medical opinions which have been specially communicated for this work, and which bring it abreast of the most recent researches with

the properties and uses of madar.

Properties of the Juice or Milky Sap .- Ainslie, Modeen Sheriff, and most other authors regard the juice as more powerful than the bark, but less valuable, owing to its being irregular in its action. Dymock says "the juice is described as a caustic, a purge for phlegm, depilatory, and the most acrid of all milky juices." (Compare this with the remarks further on, under the heading 'an alcoholic liquor said to be prepared from this sap.) Medicinally it is recommended for skin diseases, ringworm of with honey, it is viewed as useful

outh, and a piece of cotton-wool

hollow tooth is reported to cure ied, in his Commentary upon the

Tuhfat, strongly recommends it in leprosy, hepatic and splenic enlarge----in is to steep The milk

· c.; the fresh Oil in which · 1 powder of

the dried leaves is dusted upon wounds to destroy excessive granulation and promote healthy action." (Dymock.) Roxburgh in his Flora of India gives the following account of the medi-

cinal properties of this plant, from which it will be seen that nearly a century ago its properties were as well known to Europeans as they are

MEDICINE, Root-bark. 183 Milky-juice. 184

> Flowers. 185 Leaves. 186

1.1

CALOTROPIS gigantea.

The Swallow worts

MEDICINE.

at the prevent days "A large quantity of an air him "ky fine Place from mounds made in every part of their shear at the natives apply it to various medicinal purposes bouldes which they empt yith plurified and the previous to even the second of the tilt property flycome. Convulsions form Cotta formed still after things are by use of characteristics. eciters, such as the lakejaw, Generals on in thisten, Paralys of to meptaints, celd sweat, president later, and repend completes Special Orivings .- The water is unally to put themorething very

limited edection from the numerous op none which he has been factored with regarding this drug. The plant in even form as employed multion-ally in earry province, and is indendione of the most extensively greated ups in Irdia.

f "The medicinal properties of Calatropis gigantra have been known to the natives of it a country from the earl est person and it is held in great extrem by the Hind i practitioners in the treatment of some somercal and skin diseases, -- so truck so, that it is called by some of them "the vegetable mercury.' There are two varieties of this plant in Southern India, -ore with blue or bluish-purp'e flowers, and if e other with cream-white. Alm " a'l the parts of Caletropie gigantes are used in med care, but the dry m'ky fuice, fresh flowers, and the root-back are by far the best and most useful. In whatever way the miky juce is collected and died, its smell and taste are the same, eis , naurer us and unple scant, but its colour and external appearance differ to a slight extent according to the method ad pied for its collection. If it is collected in shallow earthen plates and deted under shade (which is the best way for the purpose), it is formed into thin layers, which, when quite dry, can be easily separated from the plates more or less entirely with a bolus knife, and are very brittle. The colour of these layers is grey or pale brown, but if the juice is collected and dried in a cup or deep vessel, it assumes the shape of the latter, and its colour is much deeper externally and paler internally. The dry june is in ether, honey.

luice are britile. sed for the pur-

pose of reducing them into powder; they also become soft when exposed to the heat of the sun; the dry juice, therefore, can only be administered in the form of pills. Hither for in its sou payed buyen, or packer in any pet and back, the feet are

. . . .

an efficient antispasmodic, alterative, and nervine tonic. It is a very useful

should be sciected from weather. The bark she but about 24 hours aft with which the bark is with a knife before the r prepared is white and b nauseous and slightly ac a corked bott as possible رخd as soر thick, . inert, to,

hot or dry is dug out, epidermis jer u Ιt

and

Medical Opinions regarding Madár.

CALOTROPIS gigantea.

one of the best substitutes for ipecacuanha in this country, and has been found useful in many of the diseases for which the latter is indicated,

MEDICINE.

Triplicane, Madras)

The following abstract from a detailed account of the use of madár juice in the cure of snake-bite may be found interesting, this is the only instance, in a very extensive series of Medical opinions, in which madár is recommended for this purpose:—

be lessened and given every hour. In no case does it require more than nine does to effect a cure If the bitten person be unconscious and not able to

When c food and pill, reco.

Madras)

"It is a common sight in Oudh, of a morning, to see the people collecting the sap to be placed on a sore or skin disease" (Colonel D. G. Putcher, Lucknow) [This may be seen all over India, but it is a remarkable fact, at the same time, that if placed on an open cut on the skin it

causes great burning and produces a bad sore -G. Watt.

"The fresh juce is used with common salt in bruises and sprains, and the fresh leaves warmed are used as poultices in theumatism, gout, and rheumatic anthritis, to relieve painful joints and in large quantities an irritant posion." The juice is an irritant, and in large quantities an irritant posion. "Grigade Surgeon F H Thornton, Monghyr" "The dried bark may be considered a substitute for ipecacuanha, and used as such, but it is very inferior to that invaluable drug "Grigade Surgeon S M Shircore, Moorshedabad" "The juice or milk of the plant is used as a rubefacient. In doses of from 5 to 10 grains with 4 grain of opium given tiwe or three times a day, it proves as efficient as ipecacuanha in cases of dysentery. It produces great heat in the stomach, but is less lable than ipecacuanha to produce yomiting."

(Annant Surgeon Farmant Rai, Moolian) "I have used powder of

gether, are found Also half a seer

ine pattent will be cured in a week." (Natire Doctor Mir Comer Als, Bhagnipur, Elawah) "A decoction of the roots used by the Santals in infantile CALOTROPIS gigantea.

The Swallow-worts

MEDICINE.

"A valuable remedy with similar effects to ipecacuanha, but not so good The bark of the root should be gathered in April The dried puce is also of value" (Assistant Surgeon Nepal Singli, Saharanpore) "Fresh leaves and juce used in guinea worm as local application Given externally, produces dryness of the throat and running from the eyes, nose, &c" (Dr Dirasha Hormarji Baria, L.M.S. Bombay) "Fifteen grains of the powdered root-bark, combined with a grain of opium, successfully used in acute dysentery Milky juice from the flowering tops cures scales rapidly" (Assistant Surgeon Shib Chunder Bhuttacharji, Chanda,

tion" (Surgeon-Major J. Robb, Ahmedabad) "A valuable remedy in It has been R. D. Murin leprosy,

itism, intes-

tinal worms, mercurial cachexia, bronchitis, elephantiasis (Hospital Assistant Choona Lall, Jubbulpore) "The dried and powdered pistils and stamens, in doses of 2 to 3 grains repeated hourly, useful in cholera. The vomiting is checked or moderated. The leaves are used as applications to rheumatic pains (Narain Misr, Hoshangabad, Central Proginces) "The powdered root bark, smoked like tobacco, is used by native physicians in syphilis The flower-buds, in doses of 5 grains, combined with black pepper and salt, are useful in dyspensia with palpitation, and in cholera In the latter disease they are used to check vomit-The leaves are used as a local application in rheumatic affections" (Hospital Assistant Lal Mahomed, Hoshangabad, Central Provinces) "The bark is said to be useful for chronic rheumatism but I did notfind it to be so ' (Surgeon-Major II T Haslitt, Salem, Madras) "Mixed with pepper the leaves are used in Mysore for cleaning the teeth. The milky juice is also used with salt to allay toothache' (F Cameron, Mysore) " Madur leaves are very useful in relieving pain and swelling due to the presence of guinea-worm, and also in other inflammatory swellings The leaves are smeared with sweet-oil and then heated by holding near a fre, and applied one over the other until a dozen or more have been placed on the affected part" (Surgeon G G Ward, Mhow) "Is called "Jilledo echettu" in Telugu This is one of the articles used by natives to pro-This is effected by brushing the mouth of the womb cure abortion through the vagina with the milk or juice of the plant. Root-bark in powder or infusion or decoction is useful as an emmenagogue." (Surpowder et indicin of decentris Bern 25 in consistent of the form gen. Major f W Lenings, Rajamundry, Godavery District) "The powdered root bark is much employed in the hospital in all obstinate forms of skind exercise and leprosy. It is nurseful alterative, as an emetic also it acts well. In skin diseases it has been used in combination with Hydro-

ba k of the rove is a good substitute for specialism. The dired flowers are useful of Visions in from 1 to a gran direct, along with sugar, in leptoxy, second by suph 1, and in protections, with milk diet ("Auggeon Major Co. 186"). The leaves, seen and with covered 1 and heater.

Madár Manna.

CALOTROPIS gigantea.

ed, are applied to the scrotum in epididymitis" (Surgeon James McCloghry, Poons) "The green leaves, tied in bundles and cut into halves, are used as a formentation by heating the cut ends in a pot in which castor oil his been warmed; useful in rheumitic affections, and largely used by the natives," (Honorary Surgeon P. Kiniley, Chicacole, Ganjam, Madras) "The freshly-pounded root-brik is used by natives as an alternitive, and the milk) juice as a vestant in rheumatism. In abscess of foot, the natives heat a brick and place half a dozen leaves over the

MEDICINE.

antiperiodic. The nowers, in the into politice, reneve pain in the neels. (Surgeon John Lancaster, Chittore)

It is probable that the above special medical opinions refer to both this

that species.

MADER LIQUOR AND MANNA.

Food and Liquor.—The Ak is said by the Arabs and Persians to yield a sugar or mannar this fact is breily alluded to by Rople (Him Bot, 175) and by Birdwood, but definite information regarding this property does not appear to have been published. It may be doubted, if indeed produced from Calotropis in Persia, whether this exerction occurs in India at all. There are other instances of a plant producing a product in one country which it fails to do in another; witness Cannabis sativation example. The manna said to be obtained from this plant is known in the bazars as Sakkur-el-ushar, and is said to be produced through the parasite action of Laransus strus.

5 "Most of the Arabian writers agree in describing a sugar or honey dew which is produced upon the plant, probably by an Anhis as suggested by Dr. Watt's observation in Chutta Nagper. The different kinds of Larinus build nests or ecoons (on various species of Echinopa) which contain sugar, eg., the Persian Sinekar-t-tighal, for a description of which (with figures) see Hanbury's Science Papers" (Dr. W. Dymock, Bombay) (Compare with the account at pags 3) of the carmsti-like juice

alluded to by Dr. Dymock)

An intoxicating liquor is by some authors said to be prepared from

LIQUOR.

manna. 187

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ferment their Giya with its milk sap "

Mr. Lisboa (Useful Plants of Bombay), on the other hand, says

CALOTROPIS gigantea,

The Swallow-worte

LIQUOR.

known to the people on the eastern side of the peninsula. This would reached India from a historic point of hould be remembered, however, that the sacred Soma of the ancient Sanskrit writers has by many botanists been associated with a species of Sarcostemma, a genus belonging to the same tribe of Swallow-worts, and not very far removed from Calotropis. We have abundant evidence of the antiquity of the

above.

TIMBPR.

TIMBER. 180

Structure of the Wood.—The plant rarely produces wood of any size; it is, however, valued for making charcoal, and is employed as gunpowder charcoal in Kathiawar and in the Deccan. (C. P. Gas, 504.) It is also made into gunpowder charcoal in the Godaveri District.

DOMESTIC AND SACRED USES.

DOMESTIC. 100

Domestic and Sacred Uses .- MANURE -" The leaves and stalks serve for reclaiming reh (covered with saline efflorescence) lands. These leaves are strewn about the ground and covered with earth, and then crushed by being stamped upon Water is then let on the land enough to flood it. When the nedated

as the nati

years became so free from saline matter as to yield a very fair crop." (Lisboa, Us Pl, Bomb, 233) "In Mysore the branches are much sought after as a manure for paddy-fields. It is estimated that wet land thus manured will yield a much superior crop." (F. Cameron, Mysore) The leaves and twigs are used in Madras to manure the fields (Indian Cal D'inhor . -'ter to the author that he has chemito discover whether or not they

an effect on teh soil

that ak leaves have a spec "The flowers are use (Bomb Gaz, VII, 42.) I flower are carefully pick

which are worn at certain from Mr. Lisboa's Usefu "In Chaturmas Maha

Rushs, taken from Skand Puran, this tree is mentioned to be the transformation of Surya, or the Sun. It is used in various ceremonies, both religrous and those of time-hallowed custom The leaves are used as patri, in the same way as those of shems, in the worship of Ganpatti, Harstálika, Pethors, &c. They are also employed in shusti pujan (a ceremony performed on the sixt

dess of Destiny) by believed that the .

mity, the man is first married to this tree, which is then cut down. This ceremony is believed to ensure the longevity of the fourth, but really the third wife whom he now marries

The Swallow-worts.

CALOTROPIS procera.

IQI

"It is ordered in the Shrávan Máhátma to worship Máruti (who is also known as Hanuman), or the Monkey-god, on every Saturday, with a garland of the flowers of this tree, which are then offered to him. The twigs are also ordered to be used as substitutes for tooth brushes in the Smritisar Granth. They are also employed as Samidhas for the feeding of sacred fires, as mentioned before."

Mir Muhammad Husain gives a good description of this plant, and mentions the fact that the wandering Arabs and Tartars make their

Makhad twist or Yalish tinder from the seed floss

Calotropis procera, R. Br , Fl. Br. Ind , IV , 18 , Wight, Ic , 1 1276 Syn —C Hamiltonii, Wall

Vetti —Safred ak, dk, dg, maddr, dkadd, Hind , Ak shakar ul ushar, shakar al lighal, PB , Spulmer, spalmak, pashkand, Trans Indus, Ak, Sind, Man lara, Mar ; Alarka Sans , Vellerku, Tam., Ma jopin, mehobin, Burm, Spalmakka, Arg.

Moodeen Sheriff, as well as U C. Dutt, gives the same vernacular names for both the species of Calotropis

Cyclop ; Smith, Dict. 278, 431, Treasury of Botany; Kew Official Guide to the Museum, p 97

Gum.-As in preceding species.

Medicine.—As under Calotropis gigantea. Root of this species specially mentioned as used by the Pathans for tooth-brush, having the ment of

which he says is not so effectual as the juice of the aloe

Special Opinions —§ "The fresh milk is employed in the Panjáb for the purposes of infinitional [The mouth of the uterus is brushed with fresh twigs of the plant in other parts of India—Fib] In a drachm dose the fresh juice will kill a large dog in 15 minutes, its action, though slower, resembles that of hidrocyanic acid, but commences with featuring at the mouth' (Brigade Surgeon F E T Astehism, Sirila) "The juice is first rubbed on the skin, and subsequently assess are put to darken the patch, and make it look like echymons or bruise" (Assistant Surgeon Blugram Dais, Karal Pindi, Panja's). "The flowers are used in cases of cholera." (Surgeon-Vajor D R Thomson, Malras).

Fodder.—Used as a camel fodder (Sind Gar, 522) According to Dr. Stocks, in his Plants of Sind (Re ords of the Goot Punks, Allin, 600), one of the four plants which the camel will not eat (Six Camel Fodder).

Domestic Uses.—In Outh this species is regarded as an ill favoured weed, nowith tanking it's wefulness.

GUM Gutta percha. 192

HEDICINE. Root 193

103 Mik 104

Flowers. 195 FODDER.

100 powestic. Too'bbrustes. 107

r.

CAMELUS.

The Camel.

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Caltha palustris, Linn.; Fl. Br. Ind., I., 21; RANUNCULACEE.

CALTHA, Linn. : Gen. Pl., I., 6.

THE MARSH MARIGOLD.

Vern .- Mamiri, baringú, PB.

References.—Stewart's Pb. Pl., 2; Smith's Dic., 258; Treasury of Bolany. Habitat.— Marshes of the western temperate Himálaya, from Kashmír to Nepal; altitude 8,000 to 10,000 feet.

MEDICINE.

Medicine.-In Hazara the root is considered poisonous.

Caltrops terrestrial, see Tribulus terrestris; aquatic, see Trapa bispinosa.

Calumba Root, see Jateorhiza palmata, Miers,; Menispermacez.

CALVCOPTERIS. Lam.: Gen. Pl., I., 686.

200

Calycopteris floribunda, Lamk.; Fl. Br. Ind., II., 449; Roxb.,

Cor. Pl., 1. 87; COMBRETACE.

Syn.—Getonia floribunda, Rozb., Fl. Ind., Ed. C. B. C., 379.

Vetn.—Kohorany, C. P.; Ukshi, Mar.; Banda murududu, Tel.; Marsada boli, Mysor.

sada bos, Mysok.

References.—Bran dis, For. Fl., 220; Kurs, For. Fl., Burm., I., 48;
Gamble, Man. Timb., 185; Dals. & Gibs., Bomb. Fl., 91.

Habitat.—A large, climbing shrub of Central and Southern India, and

MEDICINE. 20I TIMBER. 202 from Assam to Singapore. Found from plains up to 2,500 feet above sea.

Medicine.—Young twigs when cut give out watery fluid used medicinally.

Structure of the Wood.—Yellowish white, moderately hard, tough, with numerous broad medullary patches of soft, pith-like texture. Used for

making tool-handles.

Calysaccion longifolium, Wight; Ill., I., 130, & Icon., 1. 1999; see Ochrocarpus longifolius, Benth. & Hook. f.; GUTTIFERE.

Calyptranthes, see Eugenia.

THE CAMEL.

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THE CAMEL.

ams only two species—both Asiatic—nel. It is by zoologists referred to the New World by the LLAMA and animals, all belonging to the genus Auchienia. The Camelide, in many respects, constitute an aberard group of the property of the proper

TWO SPECIES.

The Camel.

CAMELUS.

bian camel
mestaction
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the control word to Autoble

been introduced to Australia ar taken kindly to the sandy expan bushes abound, similar to those

warm countries. The Bactman camel, on the other hand, requires a colderclimate than the dromedary. The Russian Asinte explorer, Golonel Prejevalsky, would appear to have discovered this animal cast-south-east of Lob-nor, in what some authors deem a truly wild or indigenous condition, and others a naturalised state—in escape from domestication. Whichever view may be taken of this question, the Bactman camel, in its dometication, is distributed from the point fixed by Prejevalsky as its indigenous habitat, throughout the region north and east of that inhabited the decoration of from the Black Sec. to Cho. and north and

they are prized as beasts of burden by the inhabitants of such countries The Bactrian camel is smaller than the dromedary, has longer, darker, and more plentiful hair, and the pads of its feet are much harder (an adaptation doubtless to the rocky region it inhabits) than those of the Palgrave, however, informs us that dark-coloured or Arabian camel even black camels exist in Arabia, and that the term dromedary should be restricted to the pale coloured, more elegantly-formed breed, which might be designated as the high-blooded race horse of his species According to some writers the camel is one of the oldest mammals now living, since fossil remains have been found in the Sinaliks of a species, which, but for its being a little larger than the Arabian camel, is scarcely distinguishable from it. How far this fact may be accepted as throwing light upon the original home of the animal is a matter of speculation. The Siwalik mountains, which skirt the foot of the Panjab Himálaya, have now been satisfactorily established as belonging to the pliocene period of Geologists, although many earlier or miscene forms seem to have survived in the Siwalik pliocenes, just as many animal forms of the latter, including the camel, have continued to the present day. Thus wild camels may be accepted as having once upon a time existed in what is now Northern India. or in the region south of the present Himalayas, but at the present day the animal only occurs there in a state of domestication and need not by any means be the actual descendant of the Siwalik camel. It is remarkable. however, that no one has ever seen the one-humped camel in a wild state. and unless we are to accept the somewhat extreme view that they may after all be but varieties of one species (hence producing a fertile hybrid or cross-breed) Prejevalsky s home of the two-humped camel need have no bearing on the question of the nativity of the so-called Arabian camel.

Colonel Yule, in his most instructive "Introductory Remarks" to Prejevalsky's Mangolia, gives a valuable summary of the vanous reference by authors to the wild came! He says "This is a somewhat interesting subject, for dischelier in the existence of the Wild Came! has been strongly expressed, and indeed not long since, by one of the greatest of scholars as well as geographical authorities on Central Asia. It is worth while, therefore, to observe that its existence by no means rests on the rumour heard by Prejevalsky There is much other evidence, none of it, perhaps, FOSSIL

204 204

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CAMELUS.

The Wild Camel.

very strong taken alone, but altogether forming a body of testimons which I have long regarded, even without recent additions, as irresistible"

Since Ool Yule published the above opinion, Prejevalsky has himself shot the so-called wild crimel near Lob-nor, so that it is now very generally accepted that a wild two-humped small and very woolly camel does exist in the region referred to

Vernacular Names - Chameau, FR , Lamel, GFR ; Lamelos GR ; flat or at HIND , Tamal or Inta, MALAY

o the camel

The Names given to the Camel

8 years of age it is armosh or ut (male) thus are to up to 8 years of age it receives the following names -

·								
	To 1 year	To 2 years	To 3 years	To 4 years	To 5 years	To 6 years	To 7 years.	To 8 years.
Male .	Toda	Masat	{Trihun, {Lihak	Chhatr	Doak	Chhìga	Nesh	Nesk
Female	Tods	Masat	Puraf	Liharı	Trokar		A set	els

M Kostenko tells us that ir Turkistan the two-humped camel is called tuya and the one-humped nar tuya

References -The following authors may be consulted -Wellsted, Chesney, (Beluchistan), Fontain (Egypt), Rob nson, Postan, Kostenko, Prejevalsky, Palgrave, and the writings of many other travellers

BREEDS AND RACES OF CAMELS

Breeds 206

This subject has already been alluded to while discussing the subject of the habitat of the camel Veterinary Surgeon Charles Steel, in a paper read befor Ind a on the camels employed in South 78-79 states that of the

"breeds (

appear to be extensive,

Raiputana supplies a great many, and from that district were derived those which were used during the siege of Delhi, our camels in South Afghanistan were almost all Sind amongst which was a very small proportion of females, whereas, with the northern army, they are reported to have abounded, we had a small number of Pahars or hill camels, and a few C ont Derc 3n

> ful, distinguished by their nting in some instances to and hand extremities being matic changes very great, air, is of lower stature as a development posteriorly, iuse, and I had no oppor-

tunity of making a post mortem examination

"The Persian possesses a thick coat, splendid capillary appendages, a deen and graceful curve, he has

erry to observe that as the il hair began to fall off in

The Camel.

CAMELUS.

patches, presenting a mangy appearance; this would probably be restored on the return of cold weather; there were only a few specimens, bought by officers above Kandahar as curiosities, so that there was little opportunity of judging as to their qualifications for transport."

MORTALITY ANONG THE CAMELS USED IN THE AFGHAN WAR.-The verdict passed by the various officers whose opinions were called for on the subject of the losses of camels during the Afghan campaign was most pronounced and uniform. The plains camels were preferable for the transport service on the hotter or Indian side, but were quite useless for the higher and colder regions. Of the plains camels those of Bikanir were superior to the Panjab, and these again better than the camels from Sind. The majority of the camels that died at Thul during June seem to have succumbed to heat-apoplery, while in the higher altitudes, death appears to have been caused through some affection of the lungs The hill camels penshed through the heat of the Bolan pass and the plains camels by the cold of the higher regions, but both had previously endured privation and excessive fatigue. It is reported that of one consignment of Panjab camels nearly 39,000 died or were lost by desertion, but it is probable that if the losses among the Sind, Baluchistan, and other camels, from the commencement to the final termination of the campaign were to be added to that number, the total losses might be close upon 60,000. These facts are alluded to mainly with the object of showing how the various breeds of camels have been acclimatised to widely different conditions Some are suitable for the carayan traffic over hot sandy regions, which has given to this beast of burden the appellation of the "ship of the desert," while others have been so far altered in their habits and character as to be useful on rocky and mountainous countries and be even capable of sleeping on ground from which the snow has been only removed for their accommodation. The principal breeds of camele have a great giere on to water, the animale c cleaning ran dly when layenging to

BREEDS.

Mortality. 207

ing the Central Asiatic and Afghan breeds of camels

PANJIB CANELS.—The following extracts from the Gazetteers regard-ing Indian camels may be found useful According to the Panjib Gasetteer for Jhang there are in that district two breeds of camels are known as the Thalwan and the Bars or Bari The Thal camel is a much lighter animal than the Bar, and cannot carry so heavy a load. The female of either breed comes into heat when it is three years old, from the middle of January to the middle of April, and it may bred from that date for 20 years, and during the same period the male may be worked but the female is rarely laden. A good male camel will carry a load of S maunds, and he will take double marches of from 20 to Paniab. 200

CAMPLUS.

The Wild Camel.

very strong taken alone, but altogether forming a body of testimony which I have long regarded, even without recent additions, as irresistable."

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ry generally
el does exist

The Names given to the Camel.	in the region referred to. Vernacular Names.—Chameau, Fr.; Kameel, Gfr.; Kamelos, Gr.; Camello, It. and Sr.; Camelus, Latin; Unt, or st., Hind.; Yamal or gamat, Aran.; Ottagam, Tan.; Lotichila or monte, Tel.; Unta, Maley. In most parti of from the construction of the construction o								
		To 1 year.	To 2 years.	To 3 years.	To 4 years.	To 5 years.	To 6 years.	To 7 years.	To 8 years.
	Male .	Toda.	Blanat.	{Trihun, {Lihak.	Chhair,	Doak.	Chhiga.	Nesh.	Nesh.
	Female .	Todi.	Masat.	Puraf.	Lihari.	Tro	tar.	Kut	eli.
Breeds. 206	Stewart; ottinger							Thesney; ottinger . Preje- abject of a paper	
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	female about	es, whe	reas, wi	th the no	rthern a	ırmy, th <i>Pahari</i> (ey are re or hill can	ported t	o have I a few
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"The Persian possesses a thick coat, splendid capillary appendages,

iceful curve; he has began to fall off in

C. 206

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The Camel.

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AVERSION TO

greater attention should be paid to the selection of camels than appears

hitherto to have been done, and it might be even commended as a desirable step to organise breeding stations on the hills for the rearing of

Paniab. 200

ing the Central Asiatic and Afghan breeds of camels.

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CAMELUS.

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The Wild Camel.

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e Names in to the amel,		Vernaci Camei gamai	llo, It. ar I, ARAB. ;	nes.—Cha d Sp.; Ca Ottagam,	melus, La Tau. ; Lo	iti-pitta o	neel, Gra. it, or st. it wonte, Te names giv	; Kamel Hind.; T	famal or , Malay.
		To 1 year.	To 2 years.	To 3 years.	To 4 years.	To 5 years.	To 6 years.	To 7 years.	To 8 years.
	Male .	Toda.	Masat.	{Trihun, { Lahak.	Chhatr.	Doak.	Chhiga.	Nesh.	Nesh.
!	Female .	Todi.	Masat.	Puraf.	Lihari.	Tro	tar.	Kut	eli.
	tuya 3	nd the c	one-hum icer – -T irt; chi	ped nar-t	uya.		vo-humped	l'allated (Thesney; ottinger Preje-
Breeds.				EEDS AND			els.		
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The Camel.

CAMELUS.

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WATER.

however, a much smaller animal than the camel, and perhaps even greater results might be looked for in the direction of acclimatising and improv-

ing the Central Asiatic and Afghan breeds of camels.

PANJAB CAMELS -The following extracts from the Gazetteers regarding Indian camels may be found useful According to the Panjab Gasetteer for Jhang there are in that district two breeds of camels are known as the Thalwan and the Bars or Bari The Thal camel is a much lighter animal than the Bar, and cannot carry so heavy a load. The female of either breed comes into heat when it is three years old, from the middle of January to the middle of April, and it may breed from that date for 20 years, and during the same period the male may be worked but the female is rarely laden. A good male camel will carry a load of 8 maunds, and he will take double marches of from 20 to Pantab. 200

CAMELUS.

The Camel.

BREEDS.

30 miles a day comfortably. In Monigomery it is stated there are three breede known as So'is - that I wand Harde s-tern a which erem to app to the colour of the animal. "The Shiz courel his long lp . relimsized head, thick skin, and is of a larger color. The Gant's carrel is grey, and has a large head, small mouth, and thin skin. The Harins camel has a small tail and is of a red co'out. This is the worse of the three kinds, as it has no endurance on a journey. The Ganta is the best." "The camels of this district are of no use for rulery." "Large herds go down annually to Bhandra for employment." "If well treated a camel will live for 40 years." The countier season is from December to March, and at 4 years of are the female brongs forth her first young ore, gestation having fasted for 12 months. She continues bearing 9 or 10 times, at intervals of 2 years. After a year the young one is weared, but it begins to pick grass when it is only 22 days old. A carrel wil feed her young and yield 12 seers of milk a day besides. The owner milks the con twice a day, leaving two texts for the young one. The mix yields curds and butter-milk, but not butter. It acts at first as a livative

Gestation.

camels are superior to the e reared in the Dera Ismail Khan distrat, being similar to those in the Panjalo generally. "No good riding camels are bred in the distrat, the few that there are being imported from Bhawalpur and Bhanfr." By the age of 16 a she-camel will have had six oals, which is about the maximum number for Thal. The Chember of the superior of the su

Sind.

SIND CAUPLS—The Sind Gasetteer, speaking of the Jerruck district, says: of the domestic animals the one-humped camel takes the first place as a berst of burden "Close to the sca-coast they are scarce, but in the upper part of the delta droves of forty to fifty are frequently seen. The delta-bred camel is smaller and lighter in limb than his Arabian congener, and be animal The Karmáti tribe breed it this division—one which in pace a thred in the Than is the first place.

Ralputana. 211 Imous all over India lasetteer says: "it is r are generally either

finer or more serviceable than those of any other part of India The horses, if not fine, are strong and wiry; and I have known a very ordinary-looking mare carry its rider eighty nules through sand one day and

Eombay. 2I2 camels In the Gujarat (Gasetter, Ahmedabad District) it; stated that the Ahmedabad camels are its prized than those brought from Marwar

C. 212

and Parkar district."

The Camel.

CAMELUS.

2: .

tch it is employed. For a short distance, and in lithy ea e h is t

load (
miles a day (of 8 to 10 hours) have to be performmon ements are desired the burden should be proIn Algeria, Morocco, Tunis, Tripoli, 300 to 400lb
010530lb In Syria, Asia Minor, Turkey in Asia,
10 600lb, but large-sized bull-camels are usually
tan, Kabul, Hindustan, Fibet, Burma, and MonCrim-Tartary and the borders of Southern Asia
latter case the Bactrian or two-humped camel is

rell says the Panjáb camels known as Sangar are ince. They are in their prime from 4 to 12 years purchased beyond that age, although a good camel.

Prime age 4-12 years. 2IQ

Iso a common practice to anoint the body with oil at Kostenko says that the Turkistan revent mange ite of 22 miles an hour with a full load, but if light-31 miles. The trotting camel gets over 61 miles an res be correct it may be added that a good Bikanir ster than the Turkistan animal The trotting mory easy, but the gallop extremely disagreeable Swift to get over 100 miles a day at a push, but the ordinhey will keep up day after day is about 40 to 50 ntions an instance of an Arab having accomplished iles in 28 hours, thus keeping up 8 miles an hour eral Chesney mentions that he crossed from Basrah ance of 9581 miles, in 19 days, a daily rate of 50 miles in this connection that in 1791 Mr. James Rennell ansactions of the Royal Society, that, owing to the uniept up by the camel, that animal might be employed ices during geographical exploration He cited that veen Aleppo and Bussora had been accomplished 322 hours, by Cupper in 310 hours, by Hunter in 299] sons being accounted for by the slightly different

Rate of marching 23 to 4 miles 220

the camel to their carts, the shafts being the foremost hump. When so yoked to a properly-constructed cart they the camel is sometimes seen

JĦ

Cameis in harness 22I

has compelled the present article
of the literature on the subto give even the commonor their modes of treatment
hable to a number of diseases
attacks of infectious diseases
purposes by far the most

DISEASES. 222

CAMELUS.

The Camel.

grass. The period of the year when rutting commences seems to have been so modified under domestication that the young are born in summer or at least during pleasantly hot weather. Kostenko tells us that in Turkistan the male gets must in the winter (from December to January), but in India this occurs from January to April. During this period the male refuses food and water and becomes unmanageable. The female is rarely worked, but is reserved for breeding purposes, and to supply the milk on which the camel breeders largely live. If well cared for a camel will live for 40 to 45 years.

POWER OF ENDURANCE

Privation 215 Privation from both food and drink—Incidentally allusion has been made, in speaking of the anatomical peculiarities of the camel, to its power of endurance. It is perhaps only necessary to state here that the most conflicting experiences of travellers and observers prevail as to the power of endurance of the camel. It may be premised that an exaggerated acceptance of this notion must of necessity prove dangerous. If anything was demonstrated more clearly than another by the high mortality among the camels during the late Afghan campaign it was, that once the camel's

Eating poisonous plants.

camels from the plains of India at all events were observed to eat plants which the hill camels would not touch, and which have the local reputation of being poisonous to the camel. In another paragraph will be found a list of the camel fodders and of the few plants which the camel

Privation from Water. 210

quickly and are satisfied with 2-3 hours grazing. If subjected to pri-

Death from Repletion, 217 tion, it can also eat to excess during times of plenty. Pottinger, in preparing for an expedition, gave his camels 15th of flour a day in addition to all the grass they could eat. So greedy is the camel of lood, after a few days' desert marching, that Sir Samuel Baker says, when it arrives in good pasture, it often dies in a few hours from inflammation caused by repletion Reference has already been mide to the popular notion

The Hump

(Comp ire with Food, &c , p. 58).

248 24 ag . pa af st c

LOAD, DISTANCE, AND RATE OF MARCHING.

LOAD, &C.

The Camel.

CAMELUS

nature of the work or which it is employed. For a short distance, and in its usual avocation, a healthy camel will carry about 1,100 to 1,200h, but Average load,

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but in the latter case the Bactrian or two-humped camel is 300 to 500lb;

Prime age 4-12 years. 210

employed Colonel J. I. Boswell says the Panjáb camels known as Sangar are - 12 --- /- -- 1 ---

It is also a common practice to anoint the body with oil at this period so as to prevent mange. Kostenko says that the Turkistan camel walks at the rate of 22 miles an hour with a full load, but if lightened he will go 3 to 31 miles. The trotting camel gets over 63 miles an hour. If these figures be correct it may be added that a good Bikinir camel trots much faster than the Turkistan animal The trotting motion is said to be very easy, but the gallop extremely disagreeable Swift camels are reported to get over 100 miles a day at a push, but the ordinary journey which they will keep up day after day is about 40 to 50 Fortune mentions an instance of an Arab having accomplished a journey of 225 miles in 28 hours, thus keeping up 8 miles an hour continuously. General Chesney mentions that he crossed from Basrah a daily rate of 50 miles

Rate of to 4 miles 220

Mr. James Rennell that, owing to the uni-

al might be employed to measure distances during geographical exploration He cited that the distance between Aleppo and Bussora had been accomplished by Carmichael in 322 hours, by Cupper in 310 hours, by Hunter in 2993 hours, the variations being accounted for by the slightly different tracts followed

Camels in harness. 221

The Kirghiz often harness the camel to their carts, the shafts being fastened by a cord passing behind the foremost hump When so yoked they will draw 730fb, but if harnessed to a properly-constructed cart they will draw 1 800 to 2,160th. In Rajputana the camel is sometimes seen voked to the plough.

DISEASES.

DISEASES.

The toward and and though

222

est facts regarding the diseases of the camel or their modes of treatment It is generally believed that the camel is liable to a number of diseases peculiar to itself, but is not subject to the attacks of infectious diseases which carry off other cattle. For military purposes by far the most

AMEL FODDERS.

Plants eaten by Camels

Sores on the Rack.

serious disorder is the result of careless loading and a badly fitting saddle, With care these need not occur, and after the next best preventive is to ascertain if r nothing is more annoying to the camel or

a more fruitful source of sores than a load heavier on one side than the It has already been stated that many of the camels employed in the Afghan campaign succumbed to heat and others to cold, but it has been contended that the privation they endured for some time previously was the actual cause of death. This seems to be proved by the immunity enjoyed by the camels belonging to the officers, most of which returned in safety to India after passing through both the heat and the cold to which they were exposed while accomplishing for months heavy and forced For an account of the diseases of the camel and their treatment, the reader is referred to a valuable memorandum written by Dr W Gilchrist, of the Madras Army, in 1842, and which to this day is perhaps the best treatise that has appeared.

Kostenko says the disease known in Turkistan as Sarpo causes the soles of the animal's feet to full off, and he adds, that as with all the other diseases to which the camel is subject, this is treated by the nomads by freedom from work and good food

FOOD AND 223

TOOD AND FODDER.

To keep a camel in health it should be allowed 6 hours' grazing and - I many and hacenant in general former

> in the foregoing account, and winter, when the country is Of the plants which e important than the others,

because no other animal can subsist on them, and they are accordingly treated as more peculiarly camel fodders. It would be much easier, however, to enumerate the plants which the camel will not eat, or which are poisonous to it, than to mention those on which it may be fed latter would almost mean a list of the plants of India object will therefore be met by furnishing two lists, vis, the plants mentioned by authors as more peculiarly camel fodders and the plants of which the camel will either not eat or on which at least it cannot subsist or which are poisonous to it

CAMEL FODDERS.

224

- 1. Acacia arabica, Willd . Leguninosa.
- 2 A Farnesiana, Willd
- 2 Ægiceras majus, Gærin , MYRSINFÆ
 - 4 Albizzia Lebbek, Benth , LPGUMINOSÆ 5 Alhagi matrorum, Desv , Leguminos &
 - THE CAMEL THORN OR SHUTAR KHÁR

amira Dura-ARAB I

Plants eaten by Camels

CAMELUS.

A widely distributed shrub of the Ganges valley and the arid and

FODDER Camel Thorn.

camel, and so much does that animal depend upon this plant that it has received the name of the camel-thorn An officer, writing after the close of the Afgha

Pishin. collect it probable t

stored for winter use

6. Amarantus polygamus Linn , AMARANTACEÆ

- 7 Anthrocuemum indicum, Mog , CHPNOPODIACEÆ
- 8 Atriplex Stocksu, Boiss , CHENOPODIACEA
- 0. Avicennia officinalis, Linn., VERBENACPÆ
- Berberis, various species, BFRBERIDFÆ
- 12 Calligonum polygonoides, Linn , Polygonace E.
- 13 Carduus nutans, Linn . Compositæ
- Id. Corchorus Antichorus, Rausch . Tilliace v.
- 15 Cressa cretica, Linn . Convolvulacem.
- 16 Crotalaria Burhia, Ham , LEGUMINOSÆ
- 17. Dalbergia Sissoo, Roxb . LEGUMINOS #
- 18 Dodonæa viscosa, Linn Sapindace &
- 19 Eclipta alba, Hassk , Composita

20 Haloxylon multiflorum, Bunge CHENOPODIACEÆ

STR -ANABASIS MULTIFLORA Mog

Vern -Gora lans, lana or land, SIND , Ghalme, TRANS INDUS

Common in the North-Western Panjab and the Salt Range, and distributed to Afghanistan Camels are fond of the plant

21. H. recurvum, Bunge,

By mistake this plant was alluded to by Stewart, and following him by all subsequent authors, including the writer (see B 162) as Caroxylon Grif fithu, Moq an Afghan plant not found in India. Haloxylon recurvum is the plant from which khar sajjs is chiefly made in India, and it is the salt plant most relished by the camel

It is known in the Trans-Indus as laghm., and in Cis-Indus as khar, in Sind as kars lans A writer in the Panjab Gasetteer says that camels thrive best if fed one day upon the lana and the next upon the pile (Salvadora oleoides). The term lana appears to be almost generic for all the Chenopodiaceous plants alluded to in this list, but it is more especially applicable to this species.

The Lani

Khar-Saill

CAMEL FODDERS.

Plants eaten by Camels.

FODDER

- 22 Halocharis violacem, Bunge , CHENOPODIACE &
- 23 Indigofera panciflora, Delile . LEGUMINOSA.
- 24 Kochia indica, Wight , CHENOPODIACPÆ
- 25 Lippia nodiflora, Rich , Verbenache
- 26 Leptadenia Spartlum, Wight . ASCLEPIADACER
- 27. Lycium europæum, Linn , Solanace R.
- 28 Melia Azadirachta, Linn . MFLIAGRA
- 20 Mimosa rubicaulis, Linn . Leguminos E.
- 30 Mollugo hata, Thunb , Picoide E.
- 31. Phænix dactyhfera, Linn , PALMÆ
- 32 Pistacia integerrima, J L Stewart, ANACARDIACEAE
- 33 P. mutica, Fisch. & They.
- 24 Prosonis spicigera, Linn , Leguvinosæ
- 35 Psoralea plicata, Delile. Leguninosa
- 36 Onercus Ilex, Linn , Cupulifer &

THE HOLLY OAK

The Oak.

Vern — Charrei, serei, balut, sháh balút, APO, Chur, bán, kathún ban, trri, yirú khareo, Pa, Spercherei, pargái, kharanja, Trans Indus

Dr Aitchison says that in Kuram the variety of this plant, devoid of

occur in Pishin

- 37 Rubia tinctorum, Linn , Rubiaceæ
- 38 Salicornia brachiata, Roxb. Chevopodiacem
- 30 Salsola fœtida, Del . CHENOPODIACPÆ

Moti lani Vern - Moti lani, PB ; Mitho lani, samunaar lani, Sind

A camel fodder, but also used in the preparation of khar sajji, especially near Jhelum

- 40 S. Kalı, Linn,
 - 41. Salvadora oleoides, Done , Salvadoraca.

Vetn — Kabbar shar, diar, sdi, vani shdi ughai, koku, piiu, pii, plemane, methi tan, Hind, Pe, Tam, Pliu, Mar, Sadni djar, methi diar, Sind

Pilu.

A large, evergreen shrub of the Panjab and Sind, often forming the greater part of the vegetation of the desert, and ascending the Trans Indus hills and Salt Range to 3 coo and 4 roo feet in allitude Flowers in April, and its fruit tipens at the beginning of the hot weather. The fruit is sweethan and is largely eaten by the natives

The leaves serve as fodder for camels

Plants eaten by Camels

CAMEL FODDERS.

42 Salvadora persica, Linn

Vern — 911 kanri ván, kauri jal, chhoti ván, PB ; Jál, N-W P , kabar (kuber by Stocks) khori djhar, khari djar, Sind; Pedda warago-wenki, Tell; Ofia, ughai, Tan

A small thick stemmed, soft-wooded tree, wild in many of the drier parts of India, eg., Panjab, Sind, Rajputana, North-West Provinces, Guzerat, Konkan, and the Circuits Produces flowers and very small black red juicy current-like berries, having a strong aromatic smell, and

isionally eaten as

43. Suzeda fruticosa, Forsk., CHENOPODIACEÆ

Vern - Chhoti láni, lunak phesak láni, baggo lána, dána, Cis Indus, Zamái, Trans-Indus; dout láni usak láni, lunak Sind

A sub-erect bush, common in North-West India from Delhi to the Indus, and d stributed westward to Africa and America I mployed in the preparation of khar says but also extolled as a camel

fodder. Major Clifford says, it is abundant at Chuckluk in Pishin

as S maritima, Damort, and S nudiflora, Mon

45. Tamarix gallica, Linn , TAMARISCIVE &

Trianthema.-Four species belonging to this genus frequent the sandy tracts of the Paniab and Sind, and according to Stocks, one or all are known as Fysur land, they are regularly eaten by camels

The following are the better known species of this genus -

46. Trianthema cyrstallina. Valil . Fignings.

47 T. monogypa, Linn

48. T. pentandra, Linn.

40 Vitis carnosa, Lam , Ampelider

50 Zizyphus nummularia, W & A . RHAMNER

Vern - Malla ber, birar jhari N W P Gangr jangra Sind Malla kokni ber maraber, jand jharberi zari biroti PB, Aarkana, TRANS INDUS, Karkanna AFO A densely branched small bush met with in the drier parts of India

Mr F Kinsman, of the Telegraph Department, informs the writer that this plant may be regarded as the most important camel fodder in a great part of Rajputana The natives, to cut the plant, have invented a peculiar axe with the cutting edge turned so that it is parallel to the

Rajputana Foddar.

225

order thus to afford both camel todder and fuel

51 Zygophillum simplex, Linn . Zigorhyller

PLANTS POISONOUS OR AT LEAST NOT WHOLESOME TO CAMELS

1. Acorus Calamus, Linn , AROIDER

Vern -Bach HIND., Vekhanda, BOMB , Vaj, ARAB , Agri turki, PERS Barı boj, PB

C. 225

FORRER.

Chhot! LanL

CAMEL FODDERS.

Plants poisonous or not wholesome to Camels.

POISONOUS.

A semi-aquatic plant, met with in damp places in India, at altitudes from 3,000 to 6,000 feet

It is reported that at Quetta and Pishin an Iris-like plant, eaten, during the Afghan campaign, by the camels from the plants, proved poisonous to them. The hill camels did not eat the plant. This seems to be the same plant which Mr. Steel speaks of under the name akri, a word which may be taken as derived from the Persian name for this plant. Mr. Steel not quite so rece poisoned by be Acoust Panjabapa.

blance to an Iris whatsoever.

2. Calotropis gigantea and C. procesa, R. Br. ; ASCLEPIADACEE.

Vern.—Ak, madér, Hind, PB, and Sind.; Spalmei, spalmak, Ast ; Ushar, Arab.; Khark, Pers.

s no resem-

Stocks enumerates this among his four plants which the camel will not eat, but the Sind Gasetieer (page 522), under the account of the district Mehar, states that it is a camel fodder. It is probable Dr. Stocks is correct.

- 3. Cannabis sativa, Linn.: URTICACE.E.
- 4. Euphorbia nerufolia, Linn. : Euphoreiace ...
- 5. E. Royleana, Bosss.
- 6. E. Tirucalli, Linn.
- 7. Nerium odorum, Solander : APOCYNACEE.

SWEET-SCENTED OLEANDER.

Vern - Kaner, kanira, ganhira, Hind , PB ; Karabi, Beng , Kanhera, kanir, Bomb.; Difti, Arab., hhar-cahrah (the Asses-bane), Pers

A common bush, with large pink or white flowers Dr. Stocks says of this plant: "It is worthy of remark that the camele ats the Nerium odorum every case Several igh death however,

poisonous wholesom against th

was suspe (Compare with Acorns).

8 Othonnopsis intermedia, Boiss.. Composite.

Vern.—Gunti. Plantu.

Mr J H Lace, of the Forest Department, Quetta, reports that the Biluchis regard this plant as possonous to the camel.

9 Peganam Harmala, Linn.: Rutace &.

Veru-Harmat, ARAE, Ishand, Pera.; Spelane, karmal, Pa. Ishand, Hind A small bush, much branched and densely clothed with dissected leaves. The who'e plant strongly scented.

The carrel will not eat this plant.

Economic Products derived from the Camels.

CAMEL-HIDE.

10. Withama coarulans, Dunal . Solayace F.

Vern —Atri, panir, Ps ; Panir, SIND; Panir bad, Pers

While this species is not eaten by camels, the allied species, W somnifera, is said to be browsed by goats, and it is possible it may therefore be also exten by camels Both species occur in Sind, the Panjab, and are distributed to Afghanistan. (Compare Nos 1 and 7)

CAMELILESH AND PRICES PAID FOR THE ANIMAL

PRICES 226

It is stated by writers on the subject that camel flesh is very tough, but that the flesh of the sucking camel is passable. The camel owners are reported to kill and eat the animals that show signs of dying, and that only the rich during festive occasions can afford to kill a young camel In India the price of a full grown camel seems to average from R25 to RI50 At Taskand a camel sells for about £6 to £10, and this price prevails over the greater part of Turkistan Palgrave, speaking of the Nejdean camels, says the "camel is somewhat slimmer and smaller than the northern, and the hair is finer. They are cheaper in proportion than sheep, twenty-five to thirty shillings is an average price"

CAMEL-HAIR.

HAIR 227

The amount of hair or wool which the camel possesses seems to be inversely to the warmth of the country in which it is found. The twohumped camel has a longer and more abundant crop than the singlehumped, and the wild camel most of all It has already been stated that the natives near Lob nor are said to hunt the wild camel on account of its hair, which is much valued for its softness. The single-humped camel, acclimatised to colder regions, loses its hair when brought into a warm country, but periodically all camels cast their hair, and the natives either wait for this or clip the hair shortly before the period at which it should be shed. This generally occurs in spring in Upper Asia, but not till May or June in India. The cold country camels yield as much as 12th of hair a year, but in India 2h is about the average This is woven into

kind of camlet' (Kashmir and Calcutta International and at the

Agra Jail exhibited carpets made "The of says

chogas o hair is r making

pencils, ver, the martin, the badger, and the polecat are also employed

CAMEL HIDE.

228

There seems to be little or no export trade from India in camel hide Locally it is employed for many minor purposes, such as the fastenings used by the camel drivers With the hair on, it is also manufactured both in Europe and in India into trunks The chief use to which it is put in India, however, is the manufacture of kuppas, or the huge skin jars employed in India for carrying oil or glis These are most probably made in the Lower Provinces (where the camel does not occur), of cow, buffalo, or

colour, it is made into

n, and useful The long

employed in Europe for f artists' hair-brushes or

s of the sable, the mini-

CAMEL'S MILK

Economic Products derived from the Carrel.

huppan 220

Kuppi

230

have lude, but the writer can it cover no area into it the man include of the immense number of skin or leaviers it just which from an aim at characteristic feature of every hat, in lawer feda. It would have excee, appear that other skins are a met mea employed in adde no camelistic, but a they are more expenses and in me if fort it a well, camelistic but as they are more expenses and in me if out it a well, camelistic similar used. The uniter ordinarial piecemp yielf forthe household supply are, I weeker, chefly made of the internal informatic come cow, or horse. It is this purpose the internal informatic and cow, or horse. It is this purpose the internal informatic both cases.

"I now skin or glore "This in the taries" are byted in our skin or glore "This in both cares the shape and size desired extent. The Iresh camet is us steed from the his sundand to a desired extent. The Iresh camet is us steed from the his, or the prepared intestinal membrane, is then driven over the mould and beaten until in firmh adheres. The mouth is now formed by working the skin around a stick or himboo and reflecting the lip in the characteristic shape. When quite dri the day is broken up and carefully removed. The smaller just or high are also ornamented with patterns can out in this particular, after these have been spick on, the ver els are variant ed over the outside. Mr. Baden Powell, in his Junjah Junja Junes, says that all Robits the kupp are often mide in "fant side shapes, some (ke just, other flutened and perforated upparently with large hiles, which of course can open only longitudinally in the thin flut body of the vive." They are also largely mide at Magharia in the Jung district and at Biklait in Rapput find, and at Cauch and Almedabad in Bombay. As interesting recount of the kupp a manifecture of Lucknow, will be found in Hory's Trade and Almedabaters of North Intar p. 138. It would appear that the

kuppeas of that city use any hide available and construct the rim over a layer of mud permanently enclosed to give rigidity

Rupp is mix

I size, the price varying accordingly

The larger size

re often "so

Ali Baba and size

to hold one mained or six or eight is

the more than sufficient than su

cient to contain two ounces may also be procured

Kuppar should not be mistriken for leather water bottles such as those made at Bikanit and used all over Northern India Camel-skins cell for about R2 to R3 a piece.

MILK. 231

CAMEL'S MILK

It is scarcely necessity to enlarge on this subject further than has already been done. It is regularly used by the camel reacers, indeed it forms an important item of their food. To those not accessioned to it is purgative, and is accordingly recommended as a medicine. It is supposed to give attength to horses, hence is commonly given to fails. According to some writers camely milk will yield butter-milk but not butter, and by others it is said to afford butter also. The writer has at present no means of setting this point, but a matter of this nature might easily end.

Halwa 232 from the shrought end to come in flat earthen plates.—

European provision store keepers in a cen sold by rible trade seems to be done in the article although it does not appear any where made in India. It is known in the bazars as mutaal ka haliv is.

The Tea-plant.

CAMELLIA TEA. 233

CAMELLIA, Linn.; Gen. Pl , I., 187.

radicle short, superior

The genus Camellia is named in honour of Camellus (Joseph Kamel), a Moravian Jesust and Asiatic explorer. The cultivated or ornamental Camellias are mainly derived from C. japonica, a native of China and Japan; this was introduced into Europe in 1740 The Camellias are easy of cultivation in warm temperate climates, the best coil being a mixture of sandy-loam and peat The pots should be well drained and the plants sparingly watered, except during the growing season. They are readily increased by cuttings or by inarching on the commoner kinds

The Chinese tea-planters are said to propagate C. Sasanqua as a shel-This small-leaved species has sweetly-scented red ter for their tea plants flowers, the odour of which is supposed to be communicated to the neighbouring tea leaves Sometimes, however, the planters pluck the leaves and even the petals of this species, and mix these with the tea in order to produce a favourite-scented mixture. The black-scented teas, shipped from Canton, are said to be flavoured with the flowers of Jasminum Sambac. This is largely grown in the suburbs of Canton, and is there known as Mok-lei

The seeds of C drupifera (formerly known as C. oleifera, Wall) yield the largest amount of oil, but all the Camellia seeds contain a useful sweet By far the most important of the Camellias, however, is that from which Tea is obtained

Linnæus, in the middle of the eighteenth century, gave the Tea plant the name of Thea sinensis (T. chinensis), but soon after, in the second

specific name being derived from the "Wú-l or Bú-l Mountains in the north-west of Fuh-kien, one of the districts most famous for its black tea." (Yule). These hypothetical Linnæan species were soon reduced to one, and that referred to the genus Camellia, under the name Camellia theifera, Griff (C Thea, Link) The so-called wild tea of Assam was rest described as a separate species under the name of Thea assamica, Masters; but recent investigation has proved this to be but a large-leaved subtropical form of C. theifers, and it is open to doubt if it be even indigerous.

CAMELLIA.

The Tea-plant.

TEA. History of It is most probably only an escape from early cultivation, so far as Assam is concerned. The first scientific tea explorers of the forests around Sadiya, namely, Drs. Wallich, McClelland, and Griffith, describe it as

Government cultivation of tea, since the stock found in Assam was of e sch inferior quality. In a correspondence with Assam tea planters, how--'-- al er or rather dege-

s the Assam

. introduction endency and was on this account presumanty a was China.

was on this account presumants and line of reasoning can scarcely be admitted, for, assuming that the Assam line of reasoning can scarcely be admitted, for, assuming that the Assam erent climates, for centuries

it suits the one would not --de the Assam

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need have no doubt as to its pean eff

to wheth

plant. "indigenous Assain, 25 ditio httle claim to such a title. The wild plants of C. theilera in Assam maye all the appearance of being escapes from cultivation, and it is a suspicious circumstance that they do not occur beyond the invaded and conquered territory now inhabited by the people who are reported to have cultivated

tea at the time of the arrival of the first European visitors to Assam In Manipur, however—a small Native State, 2° or 3° south of the region of the Assam and in the very latitude of the accepted Chinese

-1--- - ald tea forms forests, the plants attaining to the

Manipur Tea. 234

> so much stress upon as a proof of illuspenses of with the remark under Camella thellera, No 244). The historic and even the accepted prehistoric colonization of Assam has many incidents in that much the cited in support of this theory. The successive waves of Siame -1 rongs ered Assam ent (surv ght times each 100 Ont of ter China to mula, in the carry substantial high had been cultivated in China

y produced a plant which in many ling bushes to be seen in the damp 1d Carbar-

The Tea-plant.

TEA.

Hybrid

235

The cross fertilization of these two forms gave origin to the popular race known as the "Assam hybrid," a term which scientifically must be viewed as incorrect, since it is not a cross between two species but between two forms of the same species. It is more accurately a cultivated form or race holding the same relation to the original species as do the races of wheat or of rice to the plants from which the multitudes of widely different kinds of these cereals have been derived. This is more than a mere technical distinction, since it accounts for many of the peculianties of this widely cultivated "hybrid" stock (such as the case by

,

the other problem Whether

any improvement in quality or healthiness of stock would result from the production of such a hybrid remains to be seen. Indeed, his may

verted from the cultivation of the plant to the improvement and cheapening of the manufacture of tea, so that the past 50 years of Indian tea cultivation have seen no new forms produced, and perhaps little improvement in the methods of cultivation.

It is constantly protested by the planter that he can distinguish the

course in its strictly scientific sense, and not in the loose popular manner in which it is but too frequently employed. A cultivated recognisable state of a plant is not necessarily a variety. A sarrety is a fixed natural departure from the specific type, in other words, it is what might be called a lower degree of species. According to this acceptation, all the forms of the mango, for example, must be thrown together as unworthy of the systematic position of constituting even one, still less many, varieties of the wild plant.

Assam Indigenous. 237

would doubtless retain its distinctive features longest, because it has been cultivated for a much greater period and acclimates do acider country than Manipur. Some of the forms of Chine-e tea are accustomed to a climate with a short but severe snowy winter. There are in India, however, at least four perfectly distinct species of Camellia, which might be left for a comparatively indefinite period, growing side by side, without losing one particle of ther distinctive features. One of these, with the true tea plant,

(conf with

CAMELLIA.

The Tea-plant,

TEA.

belongs to the section Thea of the genus Camellia, vie., C. candata, a species met in Bhután, the Mishmi hils, the Khásia hills, and even in Sylhet and Burma. Has any effort ever been made either to propagate this species, or to use it as a hardy stock for grafting, inarching, or hybridising with, or have its properties, as a possible source of tea, been tested? From a purely theoretical point of view it would seem desirable that this subject receive attention, for, should the suggested hopes of

First Assam Tea Garden.

instructive paper read before the Society of Arts (May 27th, 1837) remarks that—"It is a matter for profound regret that this garden (Chabwa) did not share the fate of its predecessor, for it proved the chief means of disseminating the pest of Assam—the miserable China variety—all over the province, not only by means of seed, but, owing to its prolific inflorescence," the indigenous Assam plants in the vicinity which now forms the great bulk of the plants found not only in India but also in Ceylon." Dr. White does not therefore show much favour either for the introduced China tea plant or for the so-called hybrid between it and the plant found in Assam. Other planters state that a first

increased quantity,
ad per b more in ...
China plant." It.
China plant is the Assam tea will fetch more in Mincing-lane, pound for pound,

than Indian grown China. But is the lesser yield, as Dr. White seems to think, due to inherent inferior quality or to insuitability to the Assam chimate? I she China plant, in other words, suited to Assam, and If not, is it possible by other means than hybridization to improve the Assam stock?

ably say
will not fi

[.] This doubtless means prolific flowering; the flowers are axillary, solitary.

 The Tea-plant.	CAMELLIA drupifera
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	•

Camellia caudata, Wall, Pl. As. Rar., III, 36; Fl. Br. Ind , I., 207: TERNSTRUMIACEA.

Species of 238

References .- Griff , Notul. IV , 550, t. 601 ; Trans Agri -Hort Soc. Ind . V., 1838, t. A.; Kure, Fl Burm , I., 109; Gamble's Man Timb., 30.

Habitat .- A smallish bush, found in the Bhutan, Mishmi, Khasia and Swinet hills, and in Martaban; at altitudes from 3,000 to 5,000 feet above

Botanic Diagnosis - Leaves with tapering points, hairy beneath and only 3 to 4 by 1 to 1 inch in size. Flowers white solitary, nodding, with the stamens and styles hairy, as also the outer surfaces of the sepals and

petals: sepals persistent.

This species is apparently not used for any industrial purpose, but it has been recommended in the preceding remarks as worthy of careful investigation as a possible source of improvement to the cultivated tea c

C. drupifera, Lour; Fl. Br. Ind , I., 293.

230

Syn.—C. Rissi, Wall, As Res, XIII, 420; Jour, As Soc., Beng, IV, 48, 12; Pl As Rar, III, 43, 5, 125; C KRINA, Don, Prod., Nepal, 224; C. MASTERSIA, Griff, Notul IV, 539; C. SIMPLICIPOLIA, Griff, Notul IV, 500, L. 604; C. CAUDATA, Griff (and Wall); C. OLEFFENA, Wall.

Vern .- Kissi, hingua, Nep , Chashing, BHUTIA and LEPCHA. References -Kurs, For. Fl., Burm , I , 109; Gamble, Man Timb , 30,

also Dargeelig List, 9.

Habitat .- A large evergreen shrub, with slender, much divided branches, met with in Nepál and on the Eastern Himalaya generally in Bhután, the Khasia hills, Northern Cachar hills, Manipur, Tenasserim, and the Andaman Islands, at altitudes from 3,000 to 8,000 feet above the sea

Botanic Diagnosis.-Leaves 3 to 4 by 1 to 14 inches in size, tapering below and having also a long acuminate apex, margin serrulate, especially towards the apex, and often revolute. Twigs puberulent, with loose membranous scales embracing th . L . - th the odour of the cherry-laurel Sepal , not persistent) Petals emarginate . free, woolly

at the base

This is closely allied to the sweetly-scented C. Sasangua of China and Japan, to which allusion has been made as cultivated in China near the bushes in order to afford shade and to impart to the leaf the sweet scent of its flowers

Oil .- It is believed this species has never been cultivated in India; but apart from any possible service it might be found to render in the direction of the suggested improvement of tea through the production of a better hybrid, this plant would seem worthy of attention as an oil-seedbearing species. At the Colonial and Indian Exhibition two or three samples of the oil from tea seed were shown and were much admired. Without any appreciable extra trouble this species might be reared as a hedge and yield a fairly remunerative oil crop at the same time. It is a

OII. 240

70	Dictionary of the Leonomic
CAMELLIA theifera.	The Tea-plant.
TEA. Sasangua Oil 241	non-drying oil of a superior quality, it is used medicinally in Cochin China, and with the oil from C. Sasangua is no doubt briggly sold as teaseed oil. The latter article is of considerable importance to the tradisticts of China and is exported to Furope. It resembles oline oil, burns with a clear bright highly, and is free from unplearant colour. The oil of Sasangua (Sauche is Japanese name) has an agreeable odour, and is used for many domestic purposes. It is obtained first by cold pressure, the pulp being boiled and again pressed indies for washing the hair. How lat the art of perfuming tens in China is carried seems uncertain, but it is possible some of the special brands may owe more to the flowers of C. Sasangua than is a present understood.
TIMBER. 242	Structure of the Wood. ~ Hard, close, and even-grained; neight 60h per cubic foot,
243	Camellia lutescens, D, cr; Fl. Br. Ind , I., 293.
	Habitat.—Mishmi Hills Botanic Diagnosis.—A shrub with much divided pale grey branches. Leaves caudate-acuminate, 2 to 31 by 1 to 11 inches, closely servate. Flore ers erect, crowded, white, becaming yellow, frigrant pubescent internally Styles short. Sigmas recurved Very little is known of this plant
True Ten Plant. 244	C. theifera, Griff, Natul IV, 558, t 601, Fl Br. Ind, I, 292 Tea, Eng, Tiil, Ir, Tisi, Germ, Tr, Dutch, It, Sp. & Scolch, Chai, Rus & Turk
	Syn — Thea sine vsis (chinensis), Linn; Thea bonea (black tea) and T virtuos (green tea), Camellia Tirea, Link; Tirea assamica, Marters, in John Agri-Hot Soc, Ind., III (1821), 63; ASSAM Tea, Wallich in John A Soc, Beng, IV, 40; t. 2. Camellia, Sp., Grif, in Trans, Aeri-Hot Soc, Bang, IV, 40; t. 2. Camellia, Sp., Grif, in Trans, Linguistan (1988), t. B. DeCandollia (Orig. nacan Soc, XVI), 337, Thea, while Baillon is the General Lanuarah original o
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	dis ca cot ill, and ent cot ill, cot il
	enthictly set as us. Vett — Tip c

Products of India,	71
The Tea-plant.	CAMELLIA theifera.
to Moon) is the Ceylon name for Thea bohea. Balfour connects the following names and to be Chinese: Mingdutu, its, keeka, kie, shek and duwer, he tother mentions the following finding and the state of	e s
References.—In addition to the publications quoted above (under botanical synony Ac., may be cons order of date of	Bibliography of Indian Tea.
the beginning of the present century.	-45
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Thea, in Royle's III, 125, 1830 Tea in Himálaya, Royle in Prod. Res, Ind., 257 and 393, 1840. Tea in Java, Cultivation and Manufacture of, Translated from the Dutch, by J. Horsfield, 1851. Tea in Robinson's Account of Assam, 1841. Cultivation of Tea on the Himálaya, a lecture delivered by Dr. J. Royle, at the Royal Asaute Society, 4th April 1841. Tea, Report on the Cultivation and Manufacture of Tea in Kumano and Gartwal by Dr. W. Jameson, 1843-45 (see also Jour. Agridort. Soc. Ind., II and IV.)	,
. by it. 1 of taile, 1151, 1003, 401). 1100 of, also Tea-seed from W, Jameson, Agra, 1852 II. 60, 233; London, 1852.	

Tea Districts of India and China, by Tea in the Kangra District, by Dr. W. . Vol. 1 (Nos. 1 to 6), p. 287, 1853)

CAMELLIA theifera.

The Tea-plant.

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The Tea plant
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   59), VIII, pp 69 and 282.
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               by, eaply of the for the multiple set, and Clavely,
   (Darjeeling), App. pp 3-11 (Himáliya), VIII, p 91 (Assam),
       03, 1875-70, p 20, 1870-77, pp 11, 49, 1877-78, p 32,
   1878 /9 pp 9 33, 1879-80, p 42, 1830-81 pp 39 54, 1831 82, pp 47, 70, 1882 83 pp 61 92, 1883 84 p 39, 1884-85, pp 21,
   47, and 1885 86 pp 28 38, 39
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Distribution of Tea Plant. 246

not appear to have observed the wild plant, and DeCandolle accordingly has come to the conclusion "that the tea plant must be wild in the mountainous region which separates the plains of India from those of China, but the use of the leaves was not formerly known in India," He further admits that "it is probable it exists also in the mountainous districts of south-eastern China, where naturalists have not yet penetrated." Loureiro (Fl Cochin, p 414) says that the tea plant is found in Cochin-China "cultivated and uncultivated" but he describes the leaves as lanceolate and acutely serrate, a description which would appear to agree better with Camellia drupifers than with the true tea plant. We now know that in Cochin China that species is cultivated on account of 1 s o l-bearing seeds. As in part supporting DeCandolle's conclusion that the "plant must be wild in the mountainous region which separates the plains of Ind.a.

CAMELLIA theifera.

The Tea plant.

TEA.

from those of China," it has been established beyond doubt that one if not two forms of the true teaplant over in certain forest glades of Assau (Japur, Sudiya, &c.) and Cach

supposition that they are either or have become acclimatised as escapes . .

cultivation in Manipur la small Native State between Assam, Lie and Burma) the plant exists as a forest tree in such profusion as to leave no possible doubt that it is truly indigenous. It is note worthy that Manipur occurs in the very latitude to which many authors fix the possible Chinese wild home of the plant It is, perhaps, desirable.

the plains of India from those of China."

ict south eastern range relative to India as

a whole The species reends furthest to the west is C druptlera,

of the Khasia and Cachar of Burma, and again south risserim and Cochin China

C thesiera wou wars

sterly habitat in the moun region it is distributed along

Coner Assam,

and Sylhet and Inpperah in South

of South Western not made into a decoction, but is caten as a p s of food. The

Western Tibetans boil tea with flour and butter and of the mixture like pudding, a habit somewhat similar to that followed by the Shans and Burmans of eating tea as a preserve instead of making a decocion from the leaves The Shans have been known to manufacture this peculiar wet tea from almost time immemorial. One of the earliest Government records of this fact will be found in a report by Colonel Hannay on Bhamo and on the capacity of the Shan Countires (dated January 1835, but reprinted in Sel Rec, Beng Gout, XXV, 1857). Various early accounts also exist of a trade in tea between Assim and Burma with

Yunnan Tea. 248

Shan Wet

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247 of with

> d China have referred to the title or no mention of the plant Chinese side of the line indi-

cated as the known a lant except at the extreme

here seems little doubt the true tea plant is now, and

4-lie common, as to the home of the uch separates the plains of toe extended. The plant in tall portion of the extreme

easterly dission of that moustus to..., and further, as already remarked, as far as we have any direct evidence to bear on the question, it exists on the Indian and not on the Chinese slopes. Far away to the east perhaps several hundred miles from the tea forests of Manipur, in South Eastern China, the great tea districts of China occur. We know very little indeed of tea in the intervening tract of nich mountainous and agit cultural counts. In the province of Si Chine several travellers have

The Tea plant.

CAMELLIA theifera. TEA.

reported tea as being found in an irregular state of cultivation. (Trav. Proneer of Commerce, page 171), speaking of the flourishing city of he city and

thousands o Ta-ts:an-

which produces the tea exported to Europe, is a tall tree, often fifteen feet high with a large coarse leaf," This is very much like a description of the so-called indigenous Assam tea plant, but it recalls also in some respects the late unfortunate Captain Gill's description (River of the Golden Sand) of a curious tea plant (also grown in Western China) but which cannot possibly, from his description, be a species of Camellia It would be worth knowing for certain if the brick tea of Western China, so largely exported to Lhasa and other parts of Tibet, be actually made and a different alant from the and and ten of China

ured grows A Tea Tree in Western China. 240

> Brick Tea of China. 250

Region of Chinese Tea Cultivation.

It is frequently found growing in regions subjected to a short but severe snowy winter, a fact which seems to have greatly influenced Royle and the other earlier advisers of the Government of India in selecting the Himalayan sites for experimental tea cultivation. Localities were actually selected where short snowy winters might be secured, and

Region of Indian Tea Cultivation.

OCCUL

\ssam) The Manipur tea forests are found on the mountains which separate the valley of Manipur from Burma and approximately between 24° and 25° North latitude. But the writer saw tea in the forests far to the north-east of Man n = none the late mainta n mass of Saramets

is much wider. It occurs in the

ar 33° North latitude, and in South 1 "North latitude. It has also been

to view it as introduced into Assam and Cachar. He would even ven habit of rea ture the suggestion that the crude mode of burying the tea leaf in the ground so as to produce the required fermentation, as practised to-day by the Shans in Upper Burma and on the borders of Manipur, may be the

Probable (Conf. with

CAMELLIA theifera

The Tea plant.

TEA

the Tibetan method of eating the ter leaves after they had been boiled in flour and butter. From this one might be pardoned drawing on magnition still further by supposing the enlightened Chinese to have improved the process of manufacture and to have refined the method of cooling by preparing an infusion from the leaves instead of eating them. As partly supporting this theory we have the astonishment expressed by several of the earlier writers that the Chinese only pour boiling water over their text and do not cook the leaves. A large trade in Cardamonia exists between the capital of Kashmfr and the neighbouring hill tribes who employ these to flavour their decochion of text in place of the signal week by the people of the west. Major Ward informs the writer that he has seen the chambered of that war on stock on the signal week of course of the control of the second of their eating it planter writes to the

Smoking Tea

of this author tea to smoke in place of tobacco, and that although it seemed interior stiff he was not able for some time to detect that it was tea and not tobacco that he had been actually smoking

The Spread of Tea Cultivatlon The stirring national migrations of the early inhabitants of Eastern Asia through the Burmo-Chinese regions, and the early trade-route which became established, with the more settled condition of the people, mght easily be supposed to have carried the tea plant at an early date to China and to India more recently by the Sam invasions. As opposed to all this it may be urged that there are references to tea in Chinese botancal works (or to what appears to be tea) at a date prior to any known migrations from Burma to China or from China to Burma or Sam. But in once of the very early supposed references to tea is mention made of eating the leaves as pickle or after being cooked into pudding or of making a beverage from them by means of boiling hot water. May not the tea plant therefore or some alined Camellia, have been cultivated in ancient China for a perfectly distinct purpose to that for which it is now grown? This line of reasoning is only on a par with the fact that down

to mode having t Bota

found in high latitudes or high allitudes but in warmer regions, such as in the damp forest glades of Assam and Cachar, and in the tea forest of Manipur, often becoming a tree from 30 to 50 or even 100 feet in he ght. Leaves variable, especially when cultivated, generally tapering at both extremities, elliptic oblong, acute or cuspidate-acuminate, puberdious or the nerves below, 4 to 8 by 1\frac{1}{2} to 2\frac{3}{2} in the wild plant often 12 to 1\frac{5}{2} by \frac{4}{2} to 6\frac{5}{2} mers white, solitary, pendulous Sepals persisted.

Improvement of Tea stock 253 In some of the cul the leaves small, and e degree of hybridisatu missingation. Indeed, it may be repeated, with the greatest assurance that the time has now come for thelplanter to devote a greater share of his time and attention to the study and improvement of his plant stock than has hitherto beet done

CHINA TEA. 254

THE HISTORY OF THE CHINA TEA

There is every reason to believe that, although the habitat of the tea plant may be somewhere on the Assam-Barman and Chinese frontier, the practice of preparing a beverage from its leaves existed for enhurse in China before it was known in India Apparently class cal scholars have failed to find any allusion to the plant or to the beverage in the

The Tea-plant.

CAMELLIA theifera.

works of the early Sanskrit, Arabic, and Persian writers. Tradition from India to China, but is is told by the Japanese In his interesting little anical Books J P. Brets-

TEA.

The Beverage made in China in the 4th Century.

entury A D) that by means of hot water a beverage is obtained from the leaves of the plant.

Thus the hierature of China allows of little doubt as to the beverage having been known in that country at least since the 4th century, and very possibly from a much earlier date. According to most writers it began to be systematically cultivated in South-Eastern China about that period, and we have a definite reference to the industry in the annals of the Tang Dynasty, 793 A D., where allusion is also made to the article having been subjected to an imperial duty. Macpherson (History of European Commerce with India) remarks that Soliman, an Araban Periodean Commerce with India) remarks that Soliman, an Araban membrant.

Japan in the 9th Century.

a is claimed, however, by some authorities for been first shown in Amsterdam and thence s authentic European notice of tea occurs in

Marco Polbeverage ir History of

Hi*story of* "have an

g

as a drink instead of wine," and he infers, perhaps correctly, that this was tea Texeria, a native of Portugal, is reported to have seen the dried leaves of tea in Malacca in the year 1000, and Olearius found tea being used in Persia in 1633

Perhaps the most amusing and at the same time instructive incidents.

in the history of tea are recorded in the proceedings of the East India Company (see Milburn's Oriental Commerce)

An officer of the Company (see Milburn's Oriental Commerce)

5, asking for "a pot of

Probably the earliest

a writer as early as 2700

the great East India Company is to be had in an entry in the Company's books in June 1651 of having presented the King with 2 h and 2 oz of "thea," which cost 40s a h. Two years later the Company appears to have been more liberal, for a second present to His Maiesty is recorded—

Tea was in use in England in the 17th Century.

#222 b of thea at 50s per b
For the two cheefs persons that attend His Majesty, thea 6 15 6"

Commercial supply in 1677.

Not, however, until the year 1677 did the East India Company take teeps to secure a regular and commercial supply of tea. The order the London Directors then issued was "for teas of the best kind to the amount of too dollars." This order seems to have been exceeded, and the market accordingly glutted, for we next read of complaints regarding the excessive consignment of 4,7130 made in 1678 (see Marpherson's Hist, European Com with India, p 131). Tea sold in London about this period at from £5 to £10 sterling a pound. Shortly after (1657) cups of tea began to be sold in the public coffee-rooms of London, especially at

Imports 4,713 lbs.

CAMELLIA The Tea-plant. theifera. TEA. "Garraway's," and a duty was claimed from the vendor of BL a gallon-In Pepys' Diary, under date of 28th September 1660, there occurs the entry: "I did send for a cup of tea (a China drink) of which I had never drank before." Yule-Burnell, in their Glossary of Anglo-Indian Terms, give numerous other passages from early English writers in which mention is made of tea down to the year 1789. The first direct duty levied on the sale of ten was in the time of William and Mary (1689); it was then subjected to a tax of 5r. a pound duty levied, 1689. and 5 per cent. on the value of the article ad valorem. This is perhaps the heaviest duty to which it has ever been subjected. As a result the that is noteworthy from Madras and the 17th century 20,000lb. It is important to add that the East India Company had secured for themselves from the British Parliament the concession of being the only merchants allowed to import tea, and for nearly 180 years they Tea Monopoly. enjoyed this monopoly, free trade in tea having only been allowed as late as 1833. In 1703 the imports into Great Britain amounted to 105,000lb, and the article was sold at 16s. a fb. In 1701, the Chinese, imitating the monopoly granted by the British Government to the East India Company, endeavoured to establish a Chinaman as the Emperor's merchant who alone would be permitted to sell tea to the Company. This auda-: · : . ient of 3 of China . n export . Iditional 10 per cent. (Aubor on China, p. 150.) In 1721 the imports into Great Britain of tea amounted to 1,000,000 b Imports 1,000,000lbs. and seven years later they had increased by another 100,000lb, the revenue therefrom having been £104,300. From 1722 to 1744 the duty was fixed at 4s. a th excise, with, in addition, a customs due of 14 per cent Macpherson has estimated that this amounted to 200 per cent. on the Adulteration. there is perhaps no other article of food that is so little adulterated. During the 100 years from 1710 to 1810 the aggregate sales of tea by the East India Company amounted to 750,219,016th, valued at £129,804,595 sterling, and of that amount 116,470,675 b were re-exported to other countries. At the present day Great Britain consumes in three years as

The Tea-plant.

CAMELLIA theifera.

they were 2,360,000h and gave an annual revenue of £318,080. This extremely favourable result, instead of suggesting the advisability of TEA

Characters; 17,171 adulteration were of course renewed with greater energy than before. But in 1781 the duty was again reduced to 12] per cent. For the three

Revenue £2.500,000.

The result was that during these 25 years the sales stood stationary at an average of 21,000,000th and vielded an average revenue of 2 million pounds sterling. The restriction in the sale of tea thus caused was greatly increased by the fact that the East India Company still retained its charter as the sole importers of tea, but in April 1834 a new state of affairs began to dawn. An Act of Parliament had abolished the East India Company's monopoly, and free trade considerably lowered Tea Monopoly. the initial price of tea. At the same time the ad valorem duty was abolished and differential rates established, and all "bohea teas" were subjected to a customs duty of 1s, 6d. alb, the better qualities of tea paying 2s.

6d. to 3s. a lb. In 1836 the duty was again altered to a uniform charge of 2s. and 1d., which rate, with the addition of 5 per cent. imposed in 1840, prevailed till

Removal of

it, was again reduced to 1s. and 5d, and in 1864 to 1s., and was heally fixed in 1867 at 6d. a pound, at which rate it still remains. Coincidently with the reduction of duty occurred an equally important considerationa fall in the price of the article. About the middle of the 17th century a pound of good tea cost in London as much as £10 sterling; at the Price of Tea.

Present duty 6d. a lb.

present day a better article may be purchased for 2s, and 6d, a pound. The writer has purposely passed over, in their chronological places, the incidents connected with the history of the Indian tea industry, deeming it desirable to give, in the first place, a succinct account of tea as a whole, and then to treat of India by itself By way of concluding this part of the history of tea, it may be repeated that, at the beginning of the 18th century, the imports of tea into Great Britain were only 20,000lb. but that in 1885 they amounted to 212,375,371fb, and were in 1883 even still higher. These facts forcibly illustrate the growth of the habit of tea-drinking during the past two centuries, and it is somewhat remarkable that this taste should have developed almost exclusively amongst the

THE HISTORY OF THE INDIAN TEA INDUSTRY.

Difficulties with China early began to make the British Government INDIAN TEA. realise the danger of having no other source of tea than China. Ultimately the whole energies of the Chinese section of the East India Com-

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CAMELLIA theifera.

The Tea-plant.

India. Seed was accordingly ...:

TEA.

Tea in America. pany were concentrated in the tea trade. Friction with the Company soon gave vent to loud outcries in England which were re-echoed by the disaffection of America. Tea in fact became intimately connected with the severance of the American Colony from the Crown of England. Colonists, disguised as Indians, boards taxed tea and threw it over-board; open rebellion. The travation of tea and in a half-hearted way the East wish of the Government that "

Ten seed sent to India in 1780.

fact of considerable interest,

one of the earliest botanists of whom we have mention, has a fitting memorial in the centre of the Seebpore Gardens. Reporting on his tea experiments he wrote to Sir Joseph Banks pointing out that the neighbourhood of Calcutta did not seem the most suited locality. In reply Sir Joseph, in 1783, addressed Warren Hastings as to the desirability

Discovery of Tea in India, 1819-1821.

Assam, discovered tea there; by others he is said to have received the plant through native agencies from Manipur. According to Balfour, he addressed Mr. G. Swinton, the then Chief Secretary to the Indian The writer

ords of the orded from Assam or from Manipur is almost immaterial. There seems no doubt

whateve existenc to have already

Society's Rooms,

Gold medal of the Society of Arts ies to secure some , taking the matter produce the best hus awakened, but

years passed before any one claimed the medal. In 1826 the brothers Bruce, inspired by Scott according to some authors, and acting independently according to others, reclassowered the tea plant in Assam; in consequence Mr. O. A. Bruce was awarded the Society of Arts gold medal; he also obtained, from the Indian Government, a grant of land in the indian government, a grant of land to the control of the contro

Society ias been of these

The Tea-plant.

CAMELLIA theifera. TEA.

> Operations commence d.

pioneers, but there seems no doubt whatever that Major (and possibly also Mr.) Bruce, had prior claims to Charlton for being the re-discoverers of the indigenous tea of Assam.

About the time these discoveries were being made in the then (to Europe at least) terra incognita of Assam, animated discussions were taking place in England which ultimately culminated in the overthrow of the East India Company's monopoly Lord William Bentinck, then Governor-General of India, took up warmly the matter of Indian tea cultivation. A committee was appointed, with Dr. N. Wallich as Secretary, to report on the situations best suited for the experimental cultivation of China tea in India Drs Wallich and Royle urged that the experiment should be first made at Kumáon, on the Himálava, being guided by a consideration of the latitude, climate, soil, and vegetation of South Eastern China closely agreeing with certain portions of the Himá-laya One of the first acts of the committee was to despatch Mr. G. J. Gordon to China, in order to collect information regarding every feature of the Chinese cultivation and manufacture of tea, and to bring away plants and seed. That gentleman had scarcely commenced his enquiries when he was recalled by the announcement that the tea plant had been found in Assam, Captain (afterwards General) Francis Jenkins had become Chief Commissioner of Assam, and he went with energy into the Bruces' discovery of tea. Had Mr. Scott's still more early discovery received even a passing consideration, Mr. Gordon would, in all

first refused to accept General Jenkins' plant, as being the true tea-yielding species, a fact which as Idness to De Walliche has no in all probability paid little or no .
he appears to have deposite

given him In consequence

the identification of the Assam plant, a commission was appointed in 1836, consisting of Drs. Wallich, McClelland, and Griffith to visit

appointed, Assam and report on the tea said to be found there. One of the most Himalayan

curious results of this commission was that the reiteration of the opinion that the Himalayan localities, formerly recommended, were preferable for experimental tea cultivation, and after those Upper Assam, and last of all the mountains of South India They, however, concluded that it would be desirable to open out one garden in Assam, but recommended that the China plant and not the degenerated Assam plant should be tried. Drs Wallich, Royle, and Falconer continued almost to the last to contend that the Himálayan localities would be preferable, but the claims of Assam were eventually recognised and urged by Drs McClelland and Griffith.

Experience has tended to show that the China plant grows better on

Gardens recommended

Tea Commission

opinions given were correct, for Drs Wallich, Royle, and Falconer were strong advocates for the pure China plant, and the localities selected by them for that plant were certainly preferable to the hotter and damper regions of Assam.

By 1834 the plants raised in the Calcutta Botanic Gardens from the seed brought from China by Mr. Gordon were ready for issue to Kumaon, and were placed under the charge of Dr Falconer, who had now succeeded Dr. Royle as Superintendent of the Saharanpur Botanic Gardens. | 1834

Seed sown in the Calcutta Botanic Gardens; plants sent CAMELLIA theifera.

The Tea plant.

TEA. First Assam Garden, 1835 Indian Tea sent to Eng-land, 1838.

In 1835 the first experimental plantation in Assam was opened up by Government in I uckimpore, and in 1839 the first commercial sample of - in was forwarded to Ingland; it amounted to 4830. and the plants were removed to Joypur in the J 1840 sold to the Assam Company, very much the largest Company the first ten concern, una in India It was anything but prosperous during the first 15 years or its existence, and its shares fell so low that they could scarcely be sold. About 1852 its prospects began to improve, and with its success the tea andustry appeared so promising and attractive, that speculators engerly rushed into it. In 1851 the imports of Indian ters into England amounted to nearly 4 million pounds In 1855 indigenous ten was discovered in Cachar, and in the following year it was found by Mahomed Warish in South Silhet (Beng Gove Sel, XXV., 45) Previous to this (in

1853) attempts had been made to cultivate ter in Darrecting, but the

ea Disaster, 1865-67.

industry was not fully started there until 1856-37. Various attempts were made between 1835 and 1810 to introduce ter into Southern India, but little interest was taken in the experiments previous to 1863 (Rubertson's Rep. Nilgiri Dist., 1875, 31)
In Chittagong and Chuin Nagpur ten cultivation was started about 1862-67. Ultimately ten cultivation sprend over every district in India, where there was the least hope of success, but with a rapidity that was certain to culminate, as it did in the great disaster of 1865-67. It is need less to dwell on the causes of that disaster, but the reader is referred to Mr Ware-Edgar's excellent and full report (Reprinted as a Parliamentary paper, C 982, 1874) It may briefly be characterised to have been the result of reckless impetuosity, ignorant supervision, and positive dishonesty Fortunes were made by the few who realised that the tide would The better-situated gardens were purchased for fewer rupees than they had cost pounds sterling to construct New companies were formed to work these gardens, and with the avowed purpose of growing tea for its own merits as a commercial article and not for the purpose of selling their gardens at a profit whenever popular favour returned to tea invest-Out of these trying times the industry rose on a firmer foundation, and the prosperity that has attended the labours of the planter has been recently and fittingly told by Dr J Berry White in the Journal of the Society of Arts Dr White has shown that the heavy expenditure on cultivation and manufacture has been so effectively reduced (and that it may be even still further lowered) that all fear of competition with China may be said to have been removed But while this is so many planters hold the opinion that a danger exists in the outery for reduction, since the point may be thereby reached of defective cultivation China, once supposed an insurmountable obstacle to the Indian planter, has, however, been practically vanquished, for within the past few months India combined with Ceylon has been leading the market. Thus in little more than half a century India has come to supply half the world's demand for tea, and there is no reason to suppose that she has by any means reached her highest level The latest returns show the shipments from China for this year as 30 million pounds below those of the preceding year Hutherto the attention of the Indian planter has been directed to compete with China in the London market, while all the time the imports into India of cheap China teas have been steadily increasing. The time has now come when the Indian planter, to extend his trade, must consider the requirements of new markets By way of strikingly illustrating the growth of the Indian tea industry

the following table has been compiled from various trustworthy sources

Growth of Indian Tea Trade.

The Tea-plant.

CAMELLIA theifera.

The British Government commenced to record separately Indian ters in 1852, but the table has been drawn up from 1864-65 to 1855-86. Briefly, it may be repeated the experts from India were in 1838 declared to be 4852b, while in 1856 they had attained the proportion of 68,781,426b.

					,	3	4
	YEAR.			Quantity ex- ported to all countries from India in D.	Value of the	Imports into Great Britain of Indian tea (from 1873 including Ceylon) in	Per centage of Indian to China teas consumed in Great Britain.
1864-65				3-457-430	29,02,840	2,510,000	3 to 97
1865-16				2,75%,187	27 50,550	5,133,000	4 to 95
186-62				6,397,088	36,63,263	7,084,400	6 to 94
1862-68				7,511,427	63,69,280	8,112,400	7 to 93
ikiè n				11,450,213	95,13,764	10,449,320	10 to 90
1869-70					1,03,78,830	13,143,700	11 to 89
1870-71			- 1	13,232,232	1,12,05 167	15 351,600	11 to 89
1571-72	•		•	17,187,328	1,45,47,846	16,942,000	13 to 87
1872-73				17,78),911	1,57,76,907	18,424,000	15 to 85
1 73-74				19,324,235	1,74,29,256	17,377,900	13 to 87
1874-75				21,137,087	1,93.74,292	25,605,100	16 to 84
1875 76		٠		24,351,599	2,16,64,168	25,605,100	17 to 83
1870-77		٠		27,784,124	2,60,74,251	29,353,700	19 to 81
1877-78	•	٠		33,459,075	3,04,45,713	31,833,300	23 to 77
1575-79	•		•	34,437,573	3,13,84,235	36,007,100	22 to 78
1879-So	•			38,174,521	3 05,10,200	39,493,700	28 to 72
1550-St	•			45,413,510	3,05,47,400	45,764,900	30 to 70
1881 82				45,691,725	3 60,01,363	54,080,300	1: to 6:3
1852-83		٠		57,766,225	3,60 01 065	61,666,500	14 to 66
1833-84			•	59,911,703	4,08,38,805	65,731,600	37 to 63
1884-85				64,162,055	4,04 47,592	68,159,600	39 to 61
1535-56	•	٠	•	68,784,249	4,30,61,335	76,585,000	41 to 59

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[Norr Thes' L		4-6 -4	.^ .		
	7.17	• • • • • • • • • • • • • • • • • • • •	,	• • • •	
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te . If c Man ea	، ك احمده :		٠٠٠٠	tin the pying a t	

Oil.—Tea-seed oil has already been alluded under Camellia drupifera, and it is only necessary to add that as this substance figures largely in Chinese and Japanese commerce it is commended to the attention of tea planters as a biproduct that might be worthy of their attention. (See Spons Encycl, psigit). An essential oil is also distilled from the leaves, oute distinct from the faith voil.

The reader is referred to another volume under TEA for an account of the Methods of Cultivation and Manufacture of Tea and for other information regarding the Commercial Article, its Chemistry, Adulteration, and Trade Statistics.

Camphire, the sweet-smelling Camphire of Solomon, is, according to some authors, the Henna of Indian writers; see Lawsonia alba, Lamk, LYTHRACEE. Camphire is by other writers a synonym for Camphor.

G 2

C. 256

nder tea and

CAMPHOR.

Forms of Camphot.

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CAMPHOR.

Camphor.

CAMPHOR, Eng.; CAMPHRE, Fr.; KAMPHER, KAMPFER, Germ.; CAN-FORA, II.: ALCANFOR, Sp.

Vern.—Kofur, kapur, ghausar, Hino ; Karpúr, képpár, Beno ; Karpura, kapur, Max., Kapur, karpúr, Guj.; Kapur, Bun.; Karuparam, karpúram, Etc.; Kappúram, kapur, Mala., Kapúra, Kan.; Karpúra, Kan., Kapúra, Kapur, Sina, Aguna, Sina, kapur, Sina,

ARAB, CESS. — Res-yos, payo, piyo, parous, 1908m.; Rapum, SING.
References. — Res-yos, payo, piyo, parous, 1908m.; Rapum, SING.
References. — Res. (Shored), Pi, Ind., Ed. CB.C., 400, Pherms. Ind., 1902,
Camphor of Sumatra, by J. Macdonald, Eig., 1n Az. Rez., Val IV,
pt. 19-33; Mason's Hurma, 483; Flück. C. Hahn, Phormaco,
1903; Mason's Hurma, 483; Flück. C. Hahn, Phormaco,
1922; Dymock, Bat. Md. W. Ind., 2nd Ed., 03 Cofs; Anniu, Mal.
1922; Dymock, Bat. Md. W. Ind., 2nd Ed., 03 Cofs; Anniu, Mal.
1943; J. Yaring, Basan Med., 31; Year-Book of Pharm., 1973;
pt. 91; Shors, Emyclop, 25-198, 796, 1934; Bullow, Cyclop, 2d Miss.
Trecurer of Balany; Ure, Mac. of Arts and Manuf.; Kew Official
Guide, Ed., Gardens and Arboreim, 120, 125.

Camphor.-The name 'Camphor' is applied to various concrete, white, odorous, and volatile products, all of vegetable origin and possessing similar properties. They would appear chemically to be secondary formations from the volatile oil of the particular plant from which they are denived. A number of plants belonging to widely different families are accordingly found to yield this substance. Of these, however, three may be regarded as important, but only one of these commercial at the present day.

FORMS OF CAMPHOR.

FORMOSA. 258

1st.—The Formosa or Chinese Camphor, and Japanese Camphor.
This is the most important—the commercial form of Camphor. It is prepared as a crystalline substance, deposited on cooling, from a decoction made from chips of the wood boiled by a process very similar to that adopted in the manufacture of catechu. The tree which affords this substance is known as the Camphor laurel, Cinnamomum Camphora, F. Nees, of the Natural Order LAURINEE, a plentiful tree in the interior of the Island to Formusa, in Japan, and throughout Cemral China. The bulk of the Camphor from these countries reaches Europe from Canton, and is - n by the collective name of Chinese Camphor; but a -arves that name, from the fact of its being

- no the mainland of China iossessions of Formosa, Campillo, inal tribes, or in the belt but is prepared in the Lou e possessions from the of debateable territory which separate-Recently, through the action of the Chinese authorities, the Formosan trade in Camphor has been almost entirely ruined, and the reports of the London drug marts rarely, if ever, now mention this once valued Camphor. In Japan, the plant flourishes throughout the three principal islands, but the extract is chiefly prepared in the province of Tost in Sikok, the mild damp sea-air of that island being apparently favourable

considerable amount of Camphor is also manufactured.

and—The Barus Camphor (from Barus, a town in Sumatra), also known as Karur Barus, Borneo Camphon, and Malay Camphor, and, in the Indian Trade Returns, as Bhimsaini or Baras. It is obtained as coarse crystals, formed naturally in the stems of Dryobalanops Camphora, Colebr. (D. aromatica, Gartin), a tree closely allied to the

to the growth of the tree. In the districts of Satsuma and Bungo a

BARUS. 250

Barus and Ngal and Perfumery Camphors.

CAMPHOR.

Indian sal and a member accordingly of the Natural Order DIPTERO-FORMS OF. CARPS. -western coast to Barus and S sland of Labua impletely destroyed, being cut up into small splinters in the search for the camphor crystals. It is stated that only about one tenth part of the trees thus ruthlessly destroyed are remunerative. The formation of this crystalline

Camphor are chiefly found in the interior of the stem, often existing in concrete masses, which occupy longitudinal cavities or fissures in the heart concrete masses, when occupy in and a half long. More frequently they fill the hollows and interstices within the timber, especially in the knots and swellings formed where branches issue from the stem. The old trees are generally the most productive, an average tree is said to yield 11h In addition to occurring within the wood, the Camphor is also found in a concrete form underneath the bark In searching for trees likely to yield

> BLUMPA. 260

at Canton and in the Island of Haman, the plant being a large, herbaceous, or bushy member of the Composition the genus Blumea. It is probable that two if not three species are used in Burma for this purpose, the most abundant being the plant employed in China, vis., B. balsamifera, DC. This species is common throughout the Eastern Himilaya, ranging from 1,000 to 4,000 feet in altitude. It occurs also in the Khásia Hills, in Chittagong, Pegu, and Burma, Peninsula to China In some Burmese Camphor, it is stated .

Wherever trees are cut down this weed springs the world with camphor of nime and and an arrival Dr. Dymock 1 common near

(See Blamea,

Vol 1, B_539)

was the species used, but this s

oil of thyme-Thymns serpillum, -one of the commonest west temperate Himalayan plants, PATCHOULI CAMPHOR (a substance known in perfumery and homologous with BORNEO CAMPHOR), prepared from Plectranthus or Pogostemon Patchoull, two herbaceous plants both mem-bers of the Labiata, which are met with in Sylhet, Burma, and the Malayan Peninsula and cultivated in many parts of India. There are, CAMPHOR.

History of Camphor.

in addition, a number of other camphors, less intimately related to India, such as Neroli Camphor, prepared from the flowers of the bitter orange, Bergamot Camphor, Barasa Camphor, Sassafras Camphor, and Orris Camphor.

In India, in addition to the species of Blumea above enumerated as yielding Ngai Camphor, there are many plants which smell strongly of camphor, some of which would most probably be found to yield hat substance. Among these may be mentioned the common aquatic weed of the plains of Bengal, Limnophila gratioloides, Br., the Karpur of the Bengalis; and also the numerous species of aromatic Blumeas, some of which have already been alluded to

HISTORY.

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History of Camphor.—Having now very briefly discussed the sources of the various kinds of Camphor, it may not be out of place to say something here of the history of that substance. The authors of the Pharmacographia inform us that there is no evidence that Camphor was known to Europe during the classical period of Greece and Rome. The first mention of the substance "occurs in one of the most ancient monuments of the Arabic language, the poems of Imru-Kasia, a prince of the Kindsh dynasty, who lived in Hadramaut in the beginning of the sixth century." About this period no mention occurs in Chinese writings of Camphor, although the tree was well known and the timber described. In the thirteenth century Marco Polo saw forests in Fokuen, South-Eastern China, of the trees which give camphor (Yule, Book of Ser. Marco Polo, II (1871), 1835). It was not, however, until Garcia do Orta in 256 pointed out that the Combor of Europe came from China, that the existence of the two forms of Europe came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Europe came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, that the existence of the two forms of Furope came from China, the two forms of Furope came from China, the came of Furope came of

China In the sexth century perfumes. "Ishak ibn Ama period, were and most expensive of physician living towards the end of the mith century, and Ibn Khurdaubah, a geographer of the same period, were among the first to point out that camphor is an export of the Malayan Archipelago, and their statements are repeated by the Arabian writers of the Middle Ages, who all assert that the best camphor is produced in Fansur. This place, also called Kunsur or Kaisur, was visited in the thriteenth century by Marco Polo, who speaks of its camphor as selling for its weight in gold (Flück & Hanb, Pharmacog).

Yule and Burnell, in their Glossery of Anglo-Indian Words, inform us that the Kantir and Kaffve-Kaiseri of some authors is the result of the perpetuation of a blunder, "originating in the misreading of loose Arabic writing The name is unquestionably fansir! The Camphor al-fansur! is mentioned as early as by Avicenna and by Marco Polo, and came from a place called Panser in Sumatra, perhaps the same as Barus, which has long given its name to the costly Sumatran drug."

The uniformity of the name Camphor, or some transparent derivative from a common root, shows that the substance was procured originally from one place, and it seems abundantly demonstrated that the Camphor first known to the world was that obtained from Drybohalanops Camphora, and not the Camphor of modern commerce, which is prepared from the wood of the Camphor alurel tree UO Dutt mentions the fact that two sorts of Camphor are referred to by Sansknit writers, "namely, pakea and apakea, that is, prepared with the aid of heat and without it. The latter is considered superior to the former. It would seem from the above description that by the term apakea karpéra, was probably meant the

Trade Returns and Commercial History.

CAMPHOR HISTORY.

Camphor obtained from Borneo from the trunk of Dryobalanops aromatica; and by the term pakea karpara, the China Camphor obtained by sublimation from the wood of Cinnamomum Camphora" (Hinda Mat. Med , 222) Dr. Dymock, in his Materia Medica of Western India, also accepts this opinion regarding the two kinds of Camphor mentioned by the Sanskrit writers. The fact that the earliest mention we have of the modern Camphor is in the thirteenth century would seem, however, to be opposed to this being the fik-i karfura of the Sanskiit writers, and the suggestion may be offered that the boiled Camphor referred to may have been Blumea or Nga Camphor, a substance which at the period indicated may either have been manufactured in India or imported from China. The history of Ngu Camphor does not appear to have been sufficiently investigated, but it is quite possible that the strongly camphoraceous bush of China and India may have been the first plant resorted to as a substitute or adulterant for the prized Camphor of Sumatra. As a matter of fact, this Camphor is much more nearly related to the Malayan than to the China Camphor, and even at the present day it is ten times the price of the Formosa Camphor, and is extensively consumed in China, partly qualities of Chinese ink.

as met with in the baz.

Sáratí káfúr, (c) Chíní-káfúr, and (d) Batás-káfúr.

TRADE RETURNS AND COMMERCIAL HISTORY.

Commerce.-While some of the less important camphors do, to a limited extent, reach Europe and India, the commercial or Chinese form is that which has been selfed "Con a on Commit The name of the beautiful to and Ind

hmed. I

It arrives in double tubs (one within the other), without any metal iming. Hence it is sometimes called "Tub Camphor." It fetches a higher price than the Formosa Camphor

ude Camphor, a small nes in tin-lined cases.

c : c : , in his Trade Review for 1875-76, gives the following note regarding the relative value of the Barus and China Camphors

"Camphor is of two kinds, Bhimsaini or Barus, and the ordinary sort The first is the produce of the Dryobalanops Camphora, and is imported from Borneo and Sumatra, where only the tree is found, viá the Straits. It is valued in the tariff at R80 per lb, while the ordinary kind, imported chiefly from China, is worth not more than R40 to R65 per cwt. This enormous difference is accounted for by the reputation (scarcely merited) which the Bhimsaini kind enjoys of peculiar excellence," (Para. 16,

bages q and 10 \ Of Borneo and Sumatra Camphor probably not more than 2 or 3 cwt. are annually imported into India.

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CAMPHOR.

Trade Returns and Commercial History.

INDIAN TRADE IN CAMPHOR.

The Import and Re-export trade in Camphor between India and foreign countries for the past seven years was as follows:-

						VALUE OF	CAMPHOR	
		Year			IMPORTED	INTO INDIA	Re-expor	TED FROM
					Bhimsaini or Barus	Other kinds	Bhimsaini or Barus,	Other kinds
					R	R	R	R
1879-80 1880-81 1881-82 1882-83 1883-84 1884-85 1885-86	:	:	:	:	 20,909 22,924 38,574 43,618 38,579 35,501 25,944	5,34,001 5,53,732 5,52,335 8,68,794 6,27,278 6,83,333 6,53,545	2,316 140 1,640 529 790 270 Nil.	23,174 26,559 21,138 25,231 28,730 13,432 16,779

In addition to the above, a small amount of Camphor is annually import-1882-83 these imports were is noteworthy that a certain comes from Great Britain

This is the European refined Camphor found in India-an article far Inis is the European Feme Compion to date in Indiana-an action superior to the water-impregnated Indian refined Camphor.

Mr. O Conor publishes, under the quotations of exports of articles of "Indian Produce and Manufacture," the following figures for Camphor

(other than Bhimsaini or Barus) .-

	Ī	ANALYSIS OF EX	PORTS FOR 1885-86
YEAR.	VALUE	Country to which exported	Province from which exported
	R		
1879-80 1880-81 1881-82 1882-83 1883-84 1884-85 1884-85	7,514 7,142 6,510 9,475 6,682 6,135 6,055	Ceylon . 4 905 Other Countries . 1,150 TOTAL 6 055	R Bombay 1,607 Madrax 4448 Total 6,055

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a peculiar cal water as poscylindrical cop sible into th put 14 parts of per drum,

crude camphor and 2; parts of water, the cover is then luted with clay, and the drum, being placed upon a small furnace made of clay, is also luted to the top of the furnace In Bombay four of these furnaces are

Penfication of Camphor.

CAMPHOR.

bult together, so that the tops form a square platform. The sublimation is completed in alexit three herris; during the process the drums are constantly imparted with rold water. Upon epening them a thin cake of camphor is found hinter the side and top; it is a strict removed and thrown into cold water. Camphor sublimed in this way is not stored, but distributed at once to the shopkerpers before it has had inner to lose weight by drying. It is a state the same proce as the crude article, the refiner's profit being derived from the introduction of water." (Mat. Med., W. And., it End., sto). This same practice seems to be followed at Delhand at a few other cities in lod a, but the method is crude and unsatisfactory, when the partified articles is compared with that imported into India from Furiope. The Furiopean pricess of tehining camphor was long kept a secret, and towards the end of the secretizerthe entiry the entire camphor of Lurope had to be sent to Holland to be sublimed. A monopoly was also held for some time in Venice, but at the present day camphor-refining is largely accomplished in England, Holland, Humburg, Paris, New York, and Philadelphia.

In Lingland the impure camphor is broken up and mixed with 3 to 5 per cent, of staked lime and t to 2 per cent of iron filings. After being well silied, this mixture is introduced through a funnel into a series of glass flishs, almost completely buried in a sand-bath. Instead of treating these primers of a fire, where flame might ginte the gas given off during the process of sublimation, dishes of fuilsbe metal, kept warm by a furnace below the room, are used. The heat is suddenly raised from 120° to 190°. C., and kept at that point for half an hour, so as to expel the water from the camphor. The temperature is then raised to 200°. C., and mintained at that point for 24 hours. When the crude camphor has melted, the sand is removed from the upper half of each of the flixs and a piper cork placed in the neck. This allows of a lower temperature in the exposed part, and in the neck. This allows of a lower temperature in the exposed part, and

European Refined, 265

thick, and weighing 9 to 12th, is removed from each bombolo or flask.

The ration ile of the process consists in preserving the temperature

uniformly at the point of volutilization; the quicklime retains resin or empyreumatic oil, the iron fixes on any sulphur that may be present,

the refined

cannot be introduce Lucknow

Lucknow at a tree there being cultivated has so far done well. It seems likely that it is true there being cultivated has so far done well. It seems likely that cam-

ily, since there is every reason were made, the tree could be larus Camphor consumed in Camphor Plants, 266

ition

le to

f the

90

Chemical Formula for Camphor.

CAMPROR OIL.

01L 267 Oil of Camphor.—There are two very distinct substances known by that name in commerce. The first and most important is the observance camphor oil of Borneo. This is obtained by tapping the trees. Sometimes this accumulates to such an extent that its with the South American copulate tree) the trunk, no more able to resist the pressure of the fluid spontaneously, bursts open or has its itssue broken into large internal chambers, producing while this occurs a loud noise, "as if the tree were the contraction of the contracti

solution a certain amount of Borneol and resin.

The other so-called Camphor-oil is quite distinct and should not be confused with the above. It is known as Camphor-oil of Formosa. This is a brown liquid, holding in solution an abundance of common camphor, and is found to drain from the cases containing crude camphor. It has an odour of stassifiers. From this so-called oil, or rather solution, camphor

is precipitated on the temperature of the liquid falling.

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CHEMICAL AND MEDICAL PROPERTIES OF CAMPHOR.

Chemistry.—It is not necessary to enter into this subject in great detail. For a full account of the chemistry of Camphor the reader is the compact of the c

papers in which this subject

has been treated of from a purely chemical point of view.

15t.—Ordinary Camping.—A white, translucent substance, of a crystalline structure, readily pulverised in the presence of a little alcohol or of the company o

t possesses ous smoky which it is iar circulai little oil.

This fact has been taken advantage of, an detecting the presence of only substances in water. Camphor is only slightly soluble in water, but the amount may be increased by the addition of sugar. Carbonic acid also increases its solvent power. Ordinary alcohol will take 75 per cent. Camphor. When mixed with resins or concrete oils, camphor often partially or completely loses its odour. The formula given for this form tally or completely loses its odour. The formula given for this form of camphor is C₁₀H₁₁O₂, by treatment with various reagents it yields a number of interesting products. Prolonged boiling with nitric acid ordines the camphor into Camphore acid, C₂H₁₁O₃ water and carbonic acid being eliminated. When repeat into Gymens or Gymal, and Cymens or Gymal.

1 C₁₀H₁₀O It is someid does not consequentg it. It is also heavier, without the aid of al-

cohol; it is, in fact, a more compact and brittle substance than ordinary

Medicinal Properties of Camphor.

CAMPHOR

camphor. It requires for fusion 198° C. In optical properties an alco- CHEMISTRY, holic solution is found to be 1210 dextrogyre By the action of nitric acid it may be converted into ordinary camphor, and by continued oxidation, into Camphoric acid. Its medicinal properties are regarded as

, more nearly related to

Medicine.—Camphor possesses stimulant, carminative, and approdistac properties, and is widely used in medicine, both externally and internally Its primary action is that of a diffusible stimulant and diaphoretic, its secondary, that of a sedative, anodyne, and antispasmodic In large doses it is an acro narcotic poison. Camphor has been extensively used in the advanced stages of levers and inflammation, insanity, asthma, angina pectoris, hooping-cough, and palpitations connected with hypertrophy of the heart, affections of the genito-urinary system, comprising dysmenorrhoea, nymphomania, spermatorrhoea, cancer, and irritable states of the

uterus, chordee, incontinence of urine, hysteria, rheumatism, gangrene, and gout. It has also been employed as an antidote to strychnia, but

MEDICINE. 260

be discussed here at great detail. The reader is therefore referred to the Pharmacopæra of India, pp 190, 192, and other standard works on materia medica. As having a special bearing on India, however, the following extract may be republished from Waring's most useful little book, Basar Medicines -

"In chronic rheumatism, in addition to its use externally, it may be given internally in a dose of 5 grains with one grain of opium at bedtime, it affords relief by causing copious perspiration, which should be promoted by a draught of infusion of ginger and by additional bedclothes An excellent vapour-bath for these cases may be made by substituting half an ounce of camphor placed on a heated plate for the chattie of hot water Thus employed, it causes speedy and copious perspiration Care, however, is necessary to prevent the patient inhaling the vapour,

bleading are reneved by the same means a nese pius aiso sometimes relieve violent palpitation of the heart. In the coughs of childhood, cam phor liniment, previously warmed, well rubbed in over the chest at nights, often exercises a beneficial effect. For young children, the strength of the limiment should be reduced one-half or more by the addition of some bland oil

"In rheumatic and nervous headaches, a very useful application is one ounce of camphor dissolved in a pint of vinegar, and then diluted with one or two parts of water. Cloths saturated with it should be kept constantly to the part.

"In spermatorrhoea, and in all involuntary seminal discharges, no

CAMPHOR

Medical Properties of Camphor.

MEDICINE

medicine is more generally useful than camphor in doses of 4 grains with half a grain of opium taken each night at bed time. In gonorities, to relieve that painful symptom, chordeé, the same prescription is generally very effectual, but it may be necessary to increase the quantity of opium to one grain, and it is advisable to apply the camphor iniment along the under surface of the pems as far as the anis. To relieve that distressing irritation of the generative organs which some women suffer from so severely, it will be found that 5 or 6 grains of camphor, taken in the form of pill twice or three times a day, according to the severity of the symptoms, will sometimes afford great relief. In each of these cases it is important to keep the bowels freely open

"In painful affections of the uterus, camphor in 6 or 8-grain doses often affords much rehe! The himment should at the same time be well rubbed into the loins. In the convulsions attendant on child but it the following pills may be tried. Camphor and calomel, of each 5 grains. Beat more a mass with a little honey, and divide into two pills, to be followed an hour subsequently by a full dose of castor oil or other purgative.

"In the advanced stages of fever, small por, and measles, when the pattern is low, weak, and exhausted, and when there are at the same time delirium, muttering, and sleeplessness, a grains of camphor, with an equal quantity of asafetida, may be given even every third hour, turpen time stupes or mustard poultices being applied at the same time to the fect or over the region of the heart. It should be discontinued if it causes headache or increased heat of the scalp. Its use requires much discrimination and caution.

"To prevent bed sores, it is advisable to make a strong solution of camphor in arrack or brandy, and with this night and morning to bathe, for a few minutes, the parts which, from continued pressure, are likely to become affected" (Waring, Basan Medicines)

The Lancet (May 31st, 1884) gives an account of a simple process of curing coryza by the inhalation of camphor vapour through a paper tube, the whole face and head being covered so as to secure the full action.

Special Opinions — 4 'Daily employed in dispensary practice in the form of camphor-water as a vehicle for other medicines. When quinine is rejected by the stomach, the following formula may be used . Ourmnegr 111, camphor gr 3, opium 3 To be made into a pill and given three or four times daily A drachm of camphor dissolved in chloroform mixed with an ounce of simple ointment forms a soothing application for piles" (Assistant Surgeon Jasuant Rai, Multan) "It is an irritant and rubefaceen, good for a cold in the head with coryza, summer diarrhear (Brigate Surgeon W R Rice, Jubbulpore) 'Largely used as a liniment for muscular pains is a good expectorant" (Surgeon R. Gray, Lahort) Used in 3 or 4-grain doses and mixed with about 1 grain of extract of belladonna I have found this to be of very great value in neuralgic puns, (Assistant Surgeon Doyal Chunder Shome, Campbell Medical School, Calcutta) 'Sumulant, expectorant, anodyne, antispasmodic, anaphrodisiac, and diaphoretic, doses t to 10 grains. I have used this in the following cases (1) In acute bronchitts, with other ingredients (2) In pneumonia, with amm carb and quinine (3) In toothache and carrous tooth, useful to rel eve the pain if stuffed in the cavity (4) In bilious headache, externally applied with vinegir and cold water (5) In chronic rheumatism, either muscular or articular, if embrocated, mixed with mustard oil and opium. (6) In a few cases of cholera (cold stage) the use of the spirit of camphor with rum has proved successful (7) In irritation and chorded of gonorrhees, il guen with beiladonna in the form of pill" (Hospital Assistant Abdulla, Civil Dispensary, Jubbulpore) "Sumulant and diaphoretic, useful in

Ilang-ilang.

CANANGA odorata.

MEDICINE.

camphor is very el

its use, and think
geon S. H. Browne, Hoshangabad, Central Provinces). "I have found
that when given in 10-grain doses every fourth hour in cholera, good
results follow. It is often administered with the fruit of the plantain to

epilepsy puerperal convulsion, palpitation of the heart" (Hospital Assistant Chuma Lal, Inbinifore) "Is taken in large doses to procure abortion" (Surgeon Mayor D. R. Thompson, Madras) "Camphot is duily used as a stimulant, antispasmodic, sedative to the genito-urnary system, and parasticted. The spirit of camphor is a useful remedy in cholera, in 1 to 5-drop doses" (Assistant Surgeon Nundo Lal Glose, Bankipur). "Camphor. Used in 3 or 4-grain doses and mixed with about 1 grain of extract of belladonna. I have found this to be of very

Sournal of Agriculture, says that most seeds are greatly hastened in their germination by being soaked, previous to sowing, in soft water, to a pint of which a lump of the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at Market at the seed of larges to be been add at the seed of larges to be been at the seed of larges at the seed of larges to be been add at the seed of larges to be been at the seed of larges at the seed of large

DOMESTI .

27 I

when placed in the soil

Camphora giandulifera, Nees, see Cinnamomum gianduliferum, Meissn ,

Canada Balsam, see Abies balsamea, Atton ; Conifere.

CANANGA, Rumph; Gen Pl, I, 24.

Cananga odorata, H. f & T. T , Fl Br. Ind., 1,56; Anonacez
The Ilang-ilang of European perfumers.

Syn.—UVARIA ODORATA, Lamb

Vern —Kadat ngan, kadapgnam, Burm , Ilang-ilang, Mala References —Rach, Fl Ind , Ed C B C , 454, Kurs, For Fl , Burm , I 31; Gamble, Man Timb, 8; U S Dispens., 15th Ed , 1752; Spons' Encyclop, 1422; Smith, Dic, Econ, Pl , 418

Habitat —A large evergreen tree of Burma (Ava and Tenasserim), distributed to Java and the Philippines Cultivated in many parts of

CANARIUM

ILANG-

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	A company of the company of the company
	Oil is said to be a solution of Hang in coccanut oil, For further information see Michelia.
	CANARIUM, Linn.; Gen. Pl., I., 324.
273	Canarium bengalense, Roxb; Fl. Br. Ind., I., 534; Burseracen
	Vern - Gogul dháp, Nepal ; Narockpa, Lepcua ; Tekreng, GARO; Bis- jang, dhuna, ASS
	References —Roxb, Fl Ind, Ed C B C, 504; Kurs, For Fl Burm, I, 200; Gamble, Man Timb, 68, x1, Voiet, Hort, Sub Cal, 121, O'Shaughnessy, Beng Dispens, 288; Royle, Him, Bot, 177; Cooks, Gums and Gum resnas, 77 Balfour, Cyclop
i	HabitatA tall tree, with a straight cylindrical stem; it is met with in
gum. 274	copal, which lcuita bazars
timber 275	it sells at two to three rupees per maund Structure of the Wood —Shining, white, when fresh cut, turning grey on exposure, soft, even-grained, does not warp, but decays readily Weight 28lb per cubic foot. It is much esteemed in Bengal for tea-
medicine. 276 Food	boxes, and also for shingles It is also valuable for building. Medicue.—5 "The leaves and bark are used externally for rheumatic swellings. Food —"Fruit edible
277 TIMBER. 278	Structure of the Wood.—"Strong and durable, used for common house building" (Trimen).
279	C. commune, Linn., Fl. Br. Ind., I, 531.
	JAVA ALMOND TREE.
	Vera — Jangali bidám, Hind ; Jangali bidánd, Cutch , Kagli mara, kagga libija, java badamiyanne, Kan , Canari, Mala , Rata-kakad, Sing
	References Roxb, Fl Ind, Ed CBC, So1, Vorgt, Hort Sub Cal. 85, U S Du- webnesst, Berg
	im reshi 109 1649 Balfari 19 Balfari 19 Balari Nat Hist, Fil
	V, 298.
	Habitat.—A plant (introduced into Bengal,
сим. 280	Gum — The resin, ir
	Pharmacographia, however, affirm that "The resin known in pharmacy as Elemi is derived from a tree growing in the Philippines, which
	C. 280
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Benral Incense: Elimi.

CANARIUM commune.

Blanco, a botanist of Manilla, described in 1845 under the name Icica Abile, but which is completely unknown to the botanists of Europe Blanco's description is such that, if correct, the plant cannot be placed in either of the old genera IQCA or Elaphnam, comprehended by Bentham and Hooker in that of Barsera, nor yet in the allied genus Canariam; in fact, even the order to which it belones is somewhat doubtful "

"Man lla I lemi is a soft, resinous substance, of granular consistence Ranilla Elema not unlike old honey, and when recent and quite pure is colourless: more often it is found contaminated with carbonaceous matter which renders it grey or blackish, and it is besides mixed with chips and similar impurities. By exposure to the air it becomes harder and acquires a vellow tint. It has a strong and pleasant odour suggestive of fennel and femon, yet with a somewhat terebinthingus. When moistened with spirit of wine. it disintegrates, and examined under the microscope is seen to consist partly of accular crystals. At the heat of boiling water the hardened drug softens, and at a somewhat higher temperature fuses into a clear

resin' (Pharmacographia, # 147)

The United States Distensatory (15th Fd), page 536, says . "The Manilla Flemi is conjecturally referred to Canarium commune." Melicanil Plants Bentley and Trimen give a detailed description of this plant. They say " It is also cultivated in lay a, and has been grown in the gardens at Calcutta, where, however, it did not thrive We cannot certainly identify it as the source of Flems, but it is probably the 'Terebinthus Luzonis prima' of Camelli, in 'Ray's History of Plants,' which he says is cilled Laguaan, Lancan, and Pagsaingan by the natives, and Arbol de la Brei by the Spaniards." Elemi is sud to be derived from the hypothetical plint Icica Abile of Blanco, a botanist of Manilla, who published a description of the tree from which the resin was obtained in 1845 under that name. Its description cannot be identified, but although, as stated above, it has been supposed to be allied to Canarium. there is no actual evidence of this, and it is doubtful if Icica, as described by Blanco, should be even referred to the BURSERACEAE

The gum is used principally in the manufacture of varnishes, also in

felting and in medicine

Oil -The nut yields a semi-solid oil on expression, similar in appearance to cocoanut oil It is used for culinary purposes, and is regarded palatable It is also burnt in lamps

6 "The bark yields an abundance of limpid oil with a pungent turpen tine smell, congealing to a buttery camphoraceous mass. It is stated to possess the same properties as copaiba (O'Shaughnessy)" (Surgeon

C. J H Warden, Professor of Chemistry, Calcutta)

Medicine -Ainslie remarks that the gum has the same properties as Balsam of Copairs It is applied in the form of an ointment to indolent The oil expressed from the kernels might be substituted for almond oil Dr Waitz, in his Diseases of Children in hot climates, speaks favourably of the kernels in emulsion as a substitute for the European preparation, Mistura Amygdala

Special Opinion .- &" A demulcent" (Surgeon W Barren, Bhus, Cutch,

Bombay)

Food -Cultivated in the Moluccas for its fruit, which is a three-sided and an arfect seed, this tastes somewhat the nuts, when fresh, is mixed from the nuts in the Island of

ly, the nuts often produce diar-

thoea (Drury).

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01L 282

MEDICINE. 283

FOOD.

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CANARIIIM strictum.

Black Dammar Tree.

285

Canarium strictum, Roxb , Fl Br. Ind., I., 534; Beddome, t. 128 THE BLACK DAMMAR TREE.

Vern.—Kálá dammár, Hind, Beng, Guj; Dhép, gágul, Bom, Dhép ráldhup, Mar, Karapu kongiliam, karapu dammar, congilium-marum, karuppu dámar, Tan, Nalla-rójan, Tel.; Manda-dhup, raldhupada, KAN & Thelly, MALA.

References.—Read, Fl. Ind., Ed. C. B.C., 501; Brddome, Fl. Sylv. J. p. 128; Gamble, Man. Timb., 68; Dals. & Gibt., Bomb Fl. 52; Voyel, Horl Sub Col., 149; Pharm. Ind., 53; Mooders Sherrf, Subp Pharm. Ind., 53; Mooders Sherrf, Subp Pharm. Ind., 53; Dymock, Mat. Med., W. Ind., 135, also 2nd. Ed., 169; Bids. Lud. of Ram Fred., Pars. Eds., 52; Drury, D. Pl. 102, Coole. Gunst and Gun resnit, 52; Birdwood, Bomb Prod., 751; Lisboo, UP. of Bomb., 49; Billyour, Cyclep., Suith's De., 152, Treasury of Botany.

Habitat .-- A tail tree of South India. Common about Courtallum in the Tinneyelly district and in Kanara.

GUM 286

Gum .- It yields a brilliant resin called the Black Dummar of South India. This is obtained by making vertical cuts in the bark and setting fire to the bottom of the stem This result is effected by lighting firewood piled to the height of a yard round the base of the trunk. The dammar exudes from the stem as high as the flames reached commencing about two years after the above operation. The flow is said to continue for ten years, between the months of April and November, and the resin is collected in January

"This substance occurs in stalactitic masses of a bright shining colour when viewed en masse, but translucent and of a deep reddish-brown colour when held between the eye and the light, homogeneous, with a vitreous fracture, partially soluble in boiling alcohol, and completely 50 in oil of turpentine (Pharm Ind)

BLACK DAMMAR. 287

The following is Mr. Broughton's report on Black Dammar . "This well-known substance offers little chance of usefulness, in Europe at least, when the many resins are considered that are found in the market at 2 far less price It is used in this country for many small purposes, as in the manufacture of bottling wax, varnishes, &c. Its colour when in solution is pale, if compared with its back tint when in mass. Thus, though insoluble in spirit, its solution in turpentine forms a tolerable varnish When submitted to destructive distillation, it yields about 78 per cent of oil, resembling that obtained from common colophony, but I fear, in the majority of its possible applications, it possesses few advantages over ordinary resin at 75 6d per cwt Major (now Col) Beddome estimates the price of Black Dammar on the coast of Kanara at R8 per 25th for nearly ten times the price of resin in England) The number of substances suitable for varnishes have lately become very numerous in Europe. Common resin is now purified by a patent process, consisting of distillation with superheated steam, by which it is obtained nearly as transparent and colourless as glass, in such amount that a single firm turns out 60 tons per week "

MEDICINE Burgundy

Medicine -The resin is used medicinally, according to Dr. Bidie, as a substitute for Burgundy Pitch in making plasters

Special Opinions 5 "Bathing in 2 tub painted inside with dam-mar is supposed to relieve the irritation of prickly heat" (Surgeon Major A S G Tyayabar, Muskat, Arabia) "Employed as a liminent with gingelly oil, in theumatic pains ' (Surgeon-Major 7 7 L Ration, Salem)

The Sword-bean.

CANAVALIA ensifor mis

CANAVALIA, Adans (? DC.); Gen, Pl. 1. 527.

Canavalia ensiformis, DC.; Fl. Br. Ind., II, 195; Wight, Ic., t. 753; Leguminosz.

SWORD BEAN. Sometimes called Patagonian Bean.

Syn -C GLADIATA, DC; DOLICHOS GLADIATUS, Will.1, as in Roxb, Fl. Ind, Ed CBC, 559, D EASIGNMIS, Linn

References.—Thwastes, En Ceylon Pl., 88, Dals & Gibs, Bomb Fl.,

b & Sund Pl., 48;

Sund, 124, Drury,

Bomb Frod, 183,

Lorans f. Home

p 144, Fig 27.

by them to mark the boundary of their plantations, from the superstitious belief that it will protect their property from plunder (Smith)

There are several forms of this plant met with in India, the seeds and flowers being of different colours (Drury) These, according to the Flora of British India, are referred to three distinct virieties —

Var 1st, virosa, W & A., Prod. 253. Dile & Gibt, Bomb R1, 69, Dolichos virosas, Roth, Fl. Ind. Ed. C B G., 559 Pods often 24 inches long, 4-6-seeded Speaking of this form, Roxburgh says: "I do not find that any part of this species is in any shape useful to the natives or others; indeed, the natives of Coromandel, where the plant is common, reckon it possonous, which is corroborated by Van Rheede." This is known in Bengal as Kathi-shim, or Kala-shim and Gaivara (Gozara) in Bombav

Var 2nd, turgida, Grah in Wall Cat, C Stocksu, Dals & Gibs, Bomb, Fl, 69 Pods large and turgid, 3 to 5 inches by 11 to 2 inches

Var, 3rd, molls, Wall Found in Southern and Western India The pods are smaller than in either of the above, when cultivated they are tender and eaten like French beans.

Food --The

3, are actually the tables of F

with large white seeds is considered the most wholesome. Some five varieties are reported to be cultivated in Lucknow, of which the form known as hiroza, whiten arrow-podded variety, is considered the best. Mr. Cameron informs the writer that the seeds of this pulse are highly relished in Misor. Atkinson writes of the North-West Provinces that the zem is "consumed by all classes."

Professor Church gives the analysis of this pulse (p. 144), and adds that its nutrient ratio is 1, 2, 2 and the nutrient value 80

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F00D 203

CANES	White Cinnamon; Caues
294	Canavalia obtusifolia, DC, Il. Br Ind, II, 196.
	References - Thwaites En, Ceylon FI, 89, Voigt, Hort. Sub Cal, 235; Drury, Us FI, 105, Balfour, Cyclop; Kew Cal, 44
Ì	Habitat.—Met with on the coasts of the Western Peninsula, Ceylon, and the Malaya Peninsula
	"Is a useful binder of loose sand" (Balfour)
295	CANELLA, Sw ; Gen Pl , I , 121, 970
	Canella alba, Murray, DC Prod, I, 563; CANELLACEE
	White Cinnamon, Eng., Canelle Blanch, Fr., Weisser zimmet, Germ., Canella Bianga, It., Canella alba, Sp., Canella Blanca, Sp.
	References - Voyet, Hort Sub Cal, 88, Pharm Ind, 25, Fluck & Hanb, Pharmacog, 73 U S Dispens, 15th Ed, 337, Year Book of Pharmacy, 1873, p 23, Spons Encyclop, 1419, Smith, Dic, 84, Treasury of Botany, Hanbury, Sc Papers, 333, Lew Cal, 14
	Habitat —A West Indian aromatic plant, the bark of which is im- ported into India, and is sold by druggists, the tree might be cultivated in India
o11. 296	Oii — "An essential oil, erroneously called 'white cinnimon,' is obtained by the aqueous distillation of the bark, it is a mixture of caryophyllic (engenic) acid, an oil resembling cajuput, and an oxygenised oil "(\$5pons, Encyclop') It is a rare article, not known to commerce
MEDICINE Bark 297	Medicine — The bark is met with in rolls or quills two or three feet in The odour is something k is an aromatic stimu other articles in consti
	tutional debility, dyspepsia, scurvy, &c (Pharm Ind) In the West Indies it is used as a condiment and has some reputation as an antiscorbutic
	CANES.
CANES 298	Canes.
290	CANNE, Fr , ROHR, Germ , Bhate, HIND , Nathur, Guz
	The species of the genus Calamus—a genus of climbing palms—yields the canes of commerce. Few plants are more useful to the hull tribes of India and the Malay than are the various forms of cane, yet very luttle of a definite nature is known as to the peculiar properties and uses of the individual species. They afford 'Dragon's blood "and the "Malacca," and "Rattan Canes" of commerce, but it is probable that each of these articles so obtained from more than one species of Calamus Reeds and small bamboos are sometimes, but incorrectly, spoken of as canes.
	The species of Calamus are formidable but graceful objects, giving a delicate green effect to the tropical vegetation Sometimes they occur as stunted erect bushes their times, by means of trees of the forest, t
Canes often 600 feet long	as much as fee feet

CANES. Asiatic Uses of Canes. large quantity of liquid, which may be collected by blowing through short Substitutes for Ropes. 200 Shalls 300 importance. THE ASIATIC USFS OF CAMPS are varied and extensive. One of the most of these Cane-bridges. is the constr march 30I may be see from Silchar to Manipur, for example, three have to be crossed, namely, parallel canes forming the pathway, the canes being knit together with bamboo or bark, so as to constitute a band not more than 18 inches in breadth, through which the rushing water may be seen below. railing affords additional support; it consists of two canes carried about three or for and there and the wh Bridges. smaller car bridge, for on raising the foot, the swaying structure and the rushing water 'ruays. In aing heavy Ropes. object va the cane is cut · · · · made into · d Sumatra. strong and indeed throughout the Eastern Islands, vessels are furnished with cables formed of cane twisted or platted. This sort of cable was formerly

and indeed throughout the Eastern Islands, vessels are furnished with cables formed of cane twisted or platted. This sort of cable was formerly extensively manufactured at Malacca" (Royle, Fibrous Plants). Dampler 5135: "Here we made two new cables of ratians, each of them lour unches about. Our captain bought the ratians, and hired a Chinese to work them, who was very expert in making such wooden cables. These cables."

of the after which

which down; nor can we carry them out but by placing two or three boats at some distance asunder, to buo, up the cable, while the long-boat rows

CANES

European Uses of Canes

Baskets
302
Chairs
303
Mats
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Cane-work
305

Walking Sticks 306 Umbrella handles 307 Umbrella ribs 308 Saddlery. 300 Harness 310 Furniture 311 Central axis 312 Window blinds 313 Dyed cane 314

Fibre from cane
315
Canemattresses
310

out the anchor" Ropes are regularly made in China by splitting the rattan and twisting the long fibres thus prepared into a rope of any desired This is rarely if ever done in India, entire canes being always The smaller canes are extensively employed in basket-work, both entire and cut Useful chairs, sofas, and couches are made all over India from cane, and cane punkha ropes are almost in universal use In Beneal baskets (dhama) are made of entire canes by twisting the canes round and round and fastening the one to the other by thin strips. The prac tice of cutting the cane into narrow strips for caning chairs may be regarded as a European industry, but it is now practised all over India the chairs made in this way being light and cool. A strong and durable floor mat for office purposes is constructed of small entire rattans, bound together, by means of cane-strings, the canes being arranged so as to be flat and parallel

THP EUROPFAN USES OF CANES are even more varied than the Asiatic They are valued on account of their lightness flexibility, and strength They are extensively used as walking sticks, umbrella handles, and even as a substitute for whalebone for umbrella and parasol ribs, each set of such ribs costing only from 1d to 21d instead of 2s 6d to 3s for whalebone. Cane is also extensively employed in saddlery and harness, and a wickerwork of rattan is now used in the construction of the German military helmet, which is said to make it sword proof But the chief purpose to which cane is put in Europe is in furniture and backet making In India. canes are cut up by hand the outer straps being separated at the expense of the central core. In Europe this central portion is saved, a patented machine being used to split the rattans which cuts off the outer layer in bands of any required size or thickness while leaving the central core in the form of a perfectly round and even rod. This rod is utilised in the construction of fancy baskets, chairs and window blinds and has one property not possessed by the strong outer bands namely that it takes with ease any desired colour European authorities do not appear to be aware, however, of the fact that the Nagas and other hill tribes of Assam dye human and goats hair a beautiful scarlet, as also tint with the same colour the outer silicious layer of the rattan cane Bands of stained rattan they use for decorating ear rings bracelets, and leggings

Prepared strpps of rattan are extensively used in Europe as in India for caning furniture, but a comparatively new and increasing frade in rattan is the construction of baskets, which are rapidly displacing willow baskets, these are used in cotton mills, sugar refineries, and other factories, as well as employed extensively by Railway Companies and by gardeners, &c. Rattan baskets are peculiarly adapted for carrying carboys containing acids, since the silica of the cane is not acted on by acids (Spons, Encyclop). The waste product, after stripping the cane, is by certain manufactures reduced to a fibre, and in this form is largely used for stuffing mattresses. Cane mattresses are in great favour on the Continent, taking the place of the cour of India

TRADE RETURNS OF CANES

Very little can be learned regarding the internal trade in rattan canes; but, from the fact of the imports (which come chefly from the Straits Settlements) into Calcutta, Madras Burma, and Bombay, far exceeding the exports, it seems that with improved facilities of communication a trade might easily be opened up with Fastern Bengal Assam and Burma which would to a large extent check the importation, from foreign countries, of a product of which India has herself an unlimited amount. The following

Trade Returns.

CANES

summary of the foreign trade in "Canes and Rattans" will be found instructive:---

Foreign Trade in Canes and Rattans

	YEAR.						RTS.	EXPORTS AND RE- EXPORTS		
						Quantity	Value.	Quantity	Value	
				_	_	Cwt	R	Cwt	R	
1879-So						20,617	1,93,035	7,483	73,582	
1830-81						21,164	1,99,557	16,346	1,62,363	
1881-82						29,559	2,92,754	23,80t	2,06,544	
1852-83						24,603	2,46,476	14,244	1,33,061	
1883 84						28,183	2,51,203	20,836	1,34 884	
1884-85						33,408	3,10,675	14,133	1,33,734	
1885 86						21,213	1,77,536	6,485	56,844	

Detail of Imports, 1885-86.

Province into which imported	Quantity.	Value	Country whence imported	Quantity.	Value
	Cwt	R		Cwt	R
Bengal Bombay and Sind Madras British Burma	7,194 9,871 1,162 2,986	66,198 79,095 8,713 23,530	Straits Settlements Other Countries	413 20,350 450	3,158 1,72,8% 1,498
TOTAL	21,213	1,77,536	TOTAL	21,213	1,77,536

Detail of Exports, 1885-86

Province from which exported	Quantity.	Value	Country to which exported	Quantity	Value
Bengal . Bombay . Madras . British Burma .	Cwt 1,525 623 637 3,700	L 20,770 2,466 1,254 32,354	United Kingdom United States. Italy Cape Colony Mauritius Other Countries	Cwt 3,827 427 63 469 187 1,512	\$5,030 8,435 1,160 6,128 1,080 5,011
TOTAL .	20,836	1,34 SS4	TOTAL .	6,485	56,844

The reader is referred for further particulars to the information given under the species of Calamus. In concluding this account of Canes, it is incressing to briefly mention a few of the more common articles sometimes sold, though incorrectly, under the name of cane. The most important is the "male ba

returns for

of grasses are also now used for this purpose; the Whangee care of China

Substitutes for canes 317

Whanges cares. 318

	y
CANNA indica.	Indian Shot.
Palm walking sticks. 319 Male bamboo 320	is one of the greatest favourites of this class. These are the beautifully jointed stems, with a portion of the root, of Phyllostachys nigra. Specially prepared palm walking-stucks may also be included under the heading of canes. These are chiefly prepared from the betel-nut palm, the palmyra palm, and from the cocoa-nut palm, and are nowa-days largely used for umbrella handles. The "Malacca cane" is obtained from Calamus Scipionum, and the rattan from C. Ratong and one or two allied species, the former obtains its beautiful colour by being smoked.
321	CANNA, Linn , Gen. Pl , III , 654
- 1	Canna indica, Linn; Roxb, Fl Ind, Ed. CB,C, 1; Scitaminez.
	Indian Shot
	Vern - Cath and Ban , Pates N W D Cat 112 energy
	Butsarana, SING
	References —Threates, En Ceylon Pl., 220, Dale & Gobr. Bom Fl. Suppl. 83, Yoret, Hort Sub Cal., 576, Fluck & Hanb, Pharmacog, O.d., U C Dutt, Mat Med Hind, 377, Drury, Us. Pl., 105, Baden Fonell, Pb Prod., \$32, Althunon, Him Dist., 730, Badonr, Cyclop, Smith, Dir., 220, Treasury of Bolany, Morton, Cyclop, Agri
	Habitat.—Several varieties are common all over India and Ceylon, chiefly in gardens, where they are grown as ornamental and flowering plants, they are in flower all the year.
DYE. Seed. 322	Dye — "The seed is black, and round like a pea and yields a beautiful but evanescent purple dye" (Dals & Gibs, Bomb Fl)
MEDICINE. Root. 323	Medicine—The ROOT is used as a diaphoretic and diurchic in fevers and dropsy (Atkinson), and also given as a demulcent (Irvine) It is considered acrid and stimulant (Fleming) When cattle have eaten any poisonous grass, which is generally discovered by the swelling of the
Seed. 324	abdomen, the natives administer to them the root of this plant, which they break up in small pieces, boil in rice-water with pepper, and give the cattle to drink (Drury) The SEED is cordial and vulnerary (Baden Powell)
FOOD Root. 325 Starch.	Food.—Drury says "Nearly all the species contain starch in the rootstock, which renders them fit to be used as food after being cooked Front from the rootstock, which renders them fit to be used as food after being cooked Front from the rootstock of the rootsto
326 Aliment or a-row-root.	
327	§ "In the West Indies arrow-root has been obtained from C. glauca, called 'Tous let mois' (O'Shaughnetsy)" (Surgeon C J. H. Warden, Professor of Chemistry, Calcutts)
DOMESTIC. 328	Domestic Uses — ueed for wrapping up sembling shot, for wl netklaces and other
Seeds, 329 Hecktares, 330	are used to thatch houses" (Drury) [See also under Beads, Vol. 1—Ea] "In Barga'ore, the leaves are used by the natures in lieu of plates, to serve rugs pudding and other dishes" (J. Camron, Esq.)
	C. 330

Indian Hemp.

cannabis sativa.

CANNABIS, Linn.; Gen. Pl, III, 357.

Cannabis sativa, Linn.; DC. Prodr., XVI., I., 30; URTICACEE.

HEMP; INDIAN HEMP; CHANVRE, Fr.; HANF, Germ.; CANAPE, II.; KONAPII, Rus.; CANAMO, Sp; HAMP, Dan.; KANAS, Keltic; CANABIS, Latin and Greek.

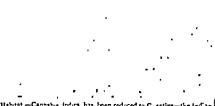
Syn -C. INDICA, Lamk.

Very control of the c

gatta, chapola, ununda, hursini, SANS i Kandir, KASIOAR, Kinnab, hirah, nabatul-quinab, kanba, KaRB ; Darahte-hirab, daratte-bang, bang, nabatul-quinab, PERS ; Bhénhan, ben, bin, sé/sa-bin, sechaub, BURM ; Matkansha, ganja gahd, kansd-gahd, SINC.

be cultivated under the name Zanums

References — DC Prod, XVI, p. I., 30. published in 1869, Roxb, Fl. Ind, Ed. C.B. C., 718, Kura, For Fl., Burm, II, 420, Dala & Gibt, Bomb Fl., Suppl., 70, Stemart, Pb. Pl., 215, Astchison, Cat. Pb. and



Habitat.—Camabis indica has been reduced to C. astira—the Indian plant being yeared as but an Asiatic condition of that species. This extends the region of the homp-plant very considerably. It has been found

CANNABIS sativa

The History of the Indian Hemp

wild to the south of the Caspian Sen, in Siberia, in the desert of Kirghiz It is also referred to a wild in Central and Southern Rusan and to the south of the Caucasus. The plant has been known since the sixth century B C in China, and is possibly indigenous on the lower mountain tracts Bossler mentions it is almost wild in Persia, and it appears to be quite wild on the Western Himflya and Kashmír, and it is acclimatised on the plants of india generally. Indeed, the intumure relation of its various Assaute names to the Sanskin bhánga would seem to fix the ancestral home of the plant somewhere in Central Asia. On the other hand the Latin and Greek Cannabia is apparently derived from the Arabic Ainnab De Candolle says that "the species has been found wild, beyond a doubt, to the south of the Caspian Sea, in Siberia, near the "frysch," in the desert of the Kirghiz, beyond Lake Baikal, and in Dahura." He is doubtful of its being a native of Southern and Central Russia, but suspects that its area may have extended into China, and is not sure about the plant being indigenous to Persia.

Hemp Accilmatised and Cultivated In India

It has gone wild as a cold season annual on rubbish heaps in Bengal and in many other parts of the plains of India. It is specially reported as springing up spontaneously on the churs of the Subarnarekhá river and to be wild in the territory of the Mohurbhunge State on the frontier of Midnapur and also in Singbhum It is cultivated more or less throughout India either on account of the MARCOTIC derived from fal the resin, charas, (b) the young tops and unfertilised female flowers-ganja (or ganja), (c) the older leaves and fruit-vessels - bhang, or on account of the fibre, HEMP, or the ripe seed from which an oil is prepared Ganja is derived from the cultivated plant, reared in Eastern Bengal the Central Provinces, and Bombay, Charas, from the cultivated plant on the mountain tracts, such as in Nepal, Kashmir, Ladakh Afghánístan, Bhang from the uid plant on the lower hills, especially in the North-West Provinces, the Panjab, and Madras. In Europe especially in Central and Southern Europe, the plant is cultivated on account of the fibre and the seeds are eaten or made into oil For some time the European form of the plant was supposed to be distinct from the Asiatic the chief value of the latter consisting in its narcotic properties, but this distinction has now disappeared from the literature of the subject since it could not be supported by botanical characters. The reduction became the more necessary when it was fully understood that, according to chimate and soil, the Indian plant varied in as marked a degree as it differed from the European On the mountains of upper India for example, it yields a good fibre which the natives separate and we've into garments or twist into ropes, but its chief value in Kashmir and Ladakh consists in the fact that just before maturing its flowers, the bark spontaneously ruptures and a resinous substance exudes This is also found upon the young leaves, flowers and fruits, and when rubbed off constitutes the narcotic charas The same plant cultivated in the plains is found not to secrete its resin in this way but instead it charges the young female flowers and twigs with the narcotic principle, this constitutes the ganja It has been observed that if even one or two male plants are left in a field, the whole crop of ganja will be destroyed since, with the fertilisation of the flowers the ganja almost entirely disappears. In other parts of India the narcotic property is not developed until the fruits are mature, leaves at this stage, and sometimes the fruits also afford blang With Cannabis indica d flering in so marked a degree according to the climite soil, and mode of cultivation it was rightly concluded that its separation from the hemp plant of Europe could not be maintained We have here, in fact, one of the most notable illustrations of the effect of climate in changing the

The History of the Indian Hemp.

Sativa.

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chemical processes which take place in the structure and physiological peculianties of a plant. In most instances, a plant taken by man from one climatic condition to another, either durs quickly, or if it survives, it exists in a sckly condition. A few plants however, such as the potato, the tobacco, the poppy, and the hemp, ecen to have the power of growing with equal luxurance under almost any climatic condition, changing or modifying currentstan. A size of this, he

it chief value.

The plant for one or other of these purposes is now extensively cultivated throughout Persu; in India, from the level of the sea in Bengal to the inner Himstrya at an altitude of 10,000 feet; in China; in Arabia; and in Africa, from the extreme south to the north, and on the mountains as well as on the plains; in the north-castern portions of America and on the table-lind of Brazil. It is also to be met with in Northern Russia even as far as Archangel. In Englandit not unfrequently occurs as a

weed, spinning up most probably from rejected birdseed.

The modes of cultivation and the nature of the soil required, depend
on the purpose for which the plant is cultivated. This subject will
accordingly be discussed later on.

HISTORY OF HEMP.

THE NARCOTIC.

Indian Literature—"The criticst synonym appears to be bhiding, which occurs in the Athrina Veda—the last of the four scriptures of the Hindis It is derived from a root which meins to break, and is supposed to imply the process of debarkation by which the fibres of the plant were separated from the stem. His would indicate that even at the remote period when the Veda in question was written, probably about 3,000 years ago, the use of hemp as a fibre-stelding plant was well known and the knoakedge fully utilised. The Veda, however, reckons it, along with the Soma, as one of the five plants "which were liberators of sin," and this would imply that its narcotic property was also well known. The word is used in the masculine form with a short final yowel, and not, as in later literature, with a long one. Both the masculine and feminine

tot some other diseases In the Historians of Manu the reminine form is used, and the plant is noticed for its fibres. In later works the feminine form prevails "(Mr Hem Chunder Kerr). The curious fact of the popular

probability, the habit of speaking of the narcotic in the masculine form of the name, and of the fibre in the feminine. As a matter of fact, the narCANNABIS sativa.

The History of the Indian Hemp.

HISTORY.

coue yielding is the reverse to the popular belief: the male or staminate

this distinction would seem to point to the idea that the ancient Chinese and Sanskrit writers were aware of the existence of male and female

flowers centuries before the sexes of plants were realised in Europe.

The intovicating property of the drug is implied in the names dinadd,
"the 193 ous," harshim, "the delight-giver;" madini, "the intoxicator,"
and ganja and ganjakini, "the noisy." The probable importation of the
narcotic in ancient times into India in a prepared form, as it comes at the
present day from Yarkand, is indicated in the name Käshmiri often
applied to it in early literature. It is thus probable that the knowledge
of the narcotic, or at least of charas, was brought to India across the
Himilava.

The Narcotic. 333

Classical Literature of Europe.—The ancient Scythians seem to have been acquainted with the narcotic properties of the plant as well as with its fibre Hyrodorus tells us that they excited themselves by "inhaling its vapour." "Hover makes Hyry administer to Tylenacius, in the house of Myrelaus, a potion prepared from nepenthes, which mide him forget his sortows. This plant had been given to her by a woman of Egyptian Thebes, and Diodorus Stollus states that the Egyptians lad much stress on this circumstance, arguing that Homyr must have lived among them, since the women of Thebes were actually noted for possessing a secret by which they could dissipate anger or melancholy. This secret is supposed to have been a knowledge of the qualities of hemp" (Fohniton, Chemistry of Common Life, 337).

Mythology. 334

Mythological History of the Narcotic—"The notices of hemp in Arabic and Persian works are much more numerous. The oldest work in which it is noticed is a treatise by Hassan, who states that in the year 658 A H., Sheik dafer Shirar, a monk of the order of Haidze, learned from his master the history of the discovery of hemp Haider lived in rigid privation on a mountain between Nishabar and Rama, where he established a monastery. After having lived ten years in this retreat, he one day returned fon heing had gat stope, where the standard part of the property of the standard part of the property of the

spot, whan wine

A curious story is told in the Hindú mythology about the origin of this plant "It is said to have been produced in the shape of nectar The History of the Hemp Fibre.

CANNABIS sativa.

More Recent Historic Facts regarding the Narcotic,-The use of hemp (bhang) in India was particularly noticed by Garcia de Orta (1563). and the plant was subsequently figured by Rheede, who described the drug as largely used on the Malabar coast. It would seem about this time to have been imported into Europe, at least occasionally, for Berlu. , of the me ston down has East 1

HISTORY.

callin.

DeLacy (1800) and Rouger (1810). But the introduction of the Indian drug into European medicine is of still more recent date, and is chiefly due to the experiments made in Calcutta by O'Shaughnessy in 1838-39. Although the astonishing effects produced in India by the administration of preparations of hemp are seldom witnessed in the cooler climate of Britain, the powers of the drug are sufficiently manifest to give it an established place in the Pharmacopæia" (Flück. & Hanb . Pharmacop., 547-48).

HISTORY OF THE HEMP FIERE.

The Fibre.

Hiero II..

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The following extract may ' e most trustworthy facts which can be of the fibre: "According to Herodotus used hemp, but in his time the Greeks were scarcely acquainted with it. King of Syracuse, bought the hemp used for the cordage of his vessels in Gaul, and Lucilius is the earliest Roman writer who speaks of the plant (100 B.C.). Hebrew books do not mention hemp. It was not used in

the fabrics which enveloped the mummies of ancient Egypt. Even at

Russia when they migrated westward about 1500 B.C. a little before the Trojan War. It may -' - 1of the Aryans into Thr have been earlier know

dwellings of Switzerlar The Arabic name

corruptions from the ' Arabic 15, however, kinn ib or konnab, admittedly the origin of the Greek Kannabis and of the Latin Cannabis, and from this again the English So in all a manner the Arat a Lack Lan

Attastin

with hasish before performing certain ceremonies or perpetrating inhuman deeds. The word according to some would appear to have been originally used in Syria to designate the followers of "the o'd man of the mountains; "by others it came into European use during the wars of the Crusaders. Certain of the Saracen army having irroxicated themselves with the hasish, rushed fearless of death into the Christian camp, comm tting CANNABIS sativa.

History of the Hemp Narcotic.

great havoc It seems probable that the English form of the word was adopted at the latter date, but that the more Arabic form was known in Europe for some time previous. Hemp is alluded to in the "Arabian Nights" under its more ancient Arabic name, being.

CULTIVA TION. 336

Expectations regarding Hemo Fibre.

CULTIVATION

It has already been incidentally remarked that the cultivation of Cannabis sativa in India is naturally referable to two sections (a) Cultivation with a view to preparing some of the forms of the narcotic, and (b) cultivation on account of the fibre. It has also been stated that the hemo plant has, to a large extent, changed its character under Indian or rather Asiatic cultivation It is very generally admitted, for example, that in the plains, while the narcotic principle is readily developed, the hemp fibre is but very imperfectly formed Let it, however, be distinctly understood that by hemp is here exclusively meant the fibre of Cannabis sativa. This remark is all the more necessary when it is added that in the Government returns of the Trade and Navigation of British India, the fibre of Cannabis sativa, as well as that of Crotalana juncea, Musa textules, and perhaps the fibres also of one or two other plants, are commercially returned as hemp, and the manufactures there-trom as hemp manufactures To obtain the true hemp fibre, a rich soil and a high state of cultivation is required in a temperate climate. The plant will grow anywhere in India, and may be said to be naturalised in every province. This fact seems to have influenced the minds of the earlier writers on this subject, who uniformly urge that since it grows so freely in a wild state, it might be cultivated to any desired extent as a source of Dr. Stocks (one of the most careful observers India has ever had) wrote in 1848 -"The plant grows well in Sind, and if it ever should be wrote in 10.00 The point gives were noted, and it ever small be found advantageous (politically or financially) to grow hemp for its fibre, then Sind would be a very proper chimate." The writer does not think that the question of its possible cultivation as a cold-season fibre-crop on the plains of India has been fully tested There may be some localities where this might be found possible* and even remunerative, but so far as the published experiments go, like flax the hemp plant may be grown freely enough, but not as a source of fibre The flax plant of the plains of India yields a superior oil-seed, and the hemp plant a valued narcotic, but neither would seem to justify the expectation of becoming a profitable fibre crop-This fact does not appear to have been fully realised by writers in Europe, and on the one hand the existing cultivation of hemp as a source of narcone has been confused with a supposed fibre production, while on the other, the reports of the limited Himálayan cultivation as a source of fibre have been mistaken as the total Indian cultivation of the plant The authors of the Pharmacographia say "It is found in Kashmir and in the Himalaya, growing to to 12 feet high and thriving vigorously at an elevation of 6,000 to 10 000 feet" Balfour, in his new ed tion of the Cyclopadia of India, while stating incidentally that the "plant is grown in Persia, Syria, Arabia and throughout India," enters into an account of its cultivation in Garhwall, with the apparent object of proving that it is more extensively grown there than in the Panjab, but he makes no mention of the fact that the principal seats of hemp cultivation, as a commercial article, are in Eastern Bengal, the Central Provinces, and Bom-The Encyclopædia Britannica has also fallen into the same mistake, and, indeed, illustrations might be multiplied to show that undue prominence has been given to the fact that the plant is grown in Garhwal, the

^{*} See a further page regard og Godavery District

The Cultivation of Hemp in India.

CANNABIS sativa. CULTIVA

Paniáb, and Kashmír, the more so since by most writers the true regions

of Indian cultivation have been, to a large extent, overlooked

Unfortunately, the available material is too meagre to allow of the subject being dealt with province by province, although there are doubtless different methods pursued in each This difficulty, fortunately, does not exist with the Lower Provinces, since Mr Hem Chunder Kerr in his Report on the Cultivation of and Trade in Ganja in Bengal (1877), has placed in the hands of the public a valuable treatise which deals both with the cultivation of the plant and the preparation of the narcotic De Forhes Poyle a seer er ad he Flor . Plants of India, a work aly the cultivation pur-

Messrs Duthie and

Fuller's Field and Garden Crops, gives a brief account of the cultivation in the North-West Provinces From these works, and the writer's own personal observations, supplemented by several less important publications, and Government reports, the following abstract regarding Indian hemp cultivation has been prepared.

(a) CULTIVATION FOR THE NARCOTIC

Bengal Cultivation —The method pursued in Eastern Bengal, according to Mr Hem Chunder Kerr, is briefly as follows. After selecting the land, for hemp cultivation, the preparation of the soil commences in March-April, but where this can be afforded operations are started even earlier. The sites selected are those which are moist but not shaded, and the soil The land is then ploughed from four to ten times, the a rich friable loam object being to free it as far as possible of all weeds Fresh earth from the surrounding ditches or from any neighbouring low-lying land is thrown over the field and it is freely manured with cowdung After a week this

is ploughed into the soil, and the ploughing repeated as often as the

means of the cultivator will admit of The belief is that for hemp the field is of the

After thrown

into ridges a foot high, the furrows being a foot in breadth

NURSERY -It is customary for the cultivators to combine in the rear

ised. On a sunny day the seed is sown broadcast and by the latter end of September, the seedlings are about 6 to 12 inches high, and are then ready for transplantation About 4 to 5 seers of seed are deemed necessary for every bigha of land to be cultivated with hemp

TRANSPLANTATION -The seedlings are planted out 6 to 8 inches apart on the a dagg prepared for the a recent on of ar ha are heen

thrown up around the plants

TREATMENT OF THE PLANTS -Trimming of the plants commences by November This consists in lopping off the lower branches so as to favour the upward growth of the shoots The ridges are again re-dressed and manured, the furrows ploughed, and all weeds removed. At this stage the plants begin to form the r flowers, when the services of an expert, known

For the Narcotic. 337

CANNABIS sativa

The Cultivation of Hemp in India

CULTIVA-TION

Fruits

injure Ganja as the gauja doctor (hoddar or parakdar) are called in This person passes through the field, furrow by furrow, cutting down all the male or stammate plants, or what are colloquially known as madi (lemale) plants Speaking of the importance of this operation Mr. Hern Chunder Kerr remarks "The presence of a few madi plants in the field suffices to more the entire crop, inasmuch as all the plants run into seed and the ganjd yielded by them is very inferior and scarcely saleable? The destruction of the madi plants is, however, never so complete but that a few escape detection the result being that a certain number of the female plants are fecundated, fruits and seeds being produced. These are thrashed out as far as possible in the manufacture of the drug, the quality of which may

be judged of by the freedom from such impurities. The female plants come to maturity about the beginning of January, but the gánja is not fully developed till a month later. The crop is sold in the field to the ganja dealers, who bring their own men to manufacture it. The crop intended to be made into what is technically known as flat ganja.

is reaped a few days before that intended for the round form

In another page will be found an account of the processes of manu
facture of the various forms of ganya, together with considerable details as
to the extent of cultivation as a source of the various forms of the narcouc

For the Fibre

(b) CULTIVATION FOR THE PIBRE HEMP

Indian Methods -Dr Royle very appropriately remarks "There is every reason for believing that the plant is of Eastern origin, while there is no sufficient reason for thinking that the climate of Europe is so pecu harly suited to the production of its fibre as to exclude those of its native climes, especially where attention is paid to those where the plant is grown on account of its fibre, and those distinguished from the others where it is cultivated for its resinous and intoxicating secret on. The latter requires exposure to light and air. These are obtained by thin sowing, while the growth of the fibre is promoted by shade and moisture, which are procured by thick sowing ' It has already been pointed out that the regions suited for ganja cultivation are perfectly distinct from those where it might be possible to develope an industry in the fibre However much it may be regretted it seems impossible to combine the two industries, and it is an accepted fact that unless utilisable as a paper stock, the unmense amount of stems annually destroyed by the Earl's cultivators must continue to be so

Godavery Verop 339

At the same time Mr. Morris in his account of the Godavery District gives some interesting facts regarding the cultivation of hemp fibre. It is planted in November and cut by the end of March. It is grown in dulis and never watered. Clay soils and those beyond the reach of inundation are those best suited. "About 12,200 bundles can be produced in one puttin of land, each bundle yielding 14 title of fibre, or a total of 3,300 viii or 4121 maunds and it valued at one rupee a maund. The expenses of cultivation are estimated at RS-S and those of the preparation of fibre at Route a puttin of land. The bundles are buried in much and left to rot for those a vector of the preparation of fibre at Route and the surface of the preparation of fibre at Route a puttin of land. The bundles are buried in the water, and after all impurities are removed the fibre is collected." The exports from the district are said to have been, in 1845 55x 400 cm.

Unless there be some mistake, Sunn hemp having been called "Canablis salara," for Mr. Morris gives that scientific name as well as the vernacular name rannum for the fibre he is describing the information is of the greatest invere t, as it would show, what the writer was not aware of un it recently, that hemp fibre was actually produced on the plains of India.

Cultivation of Hemp in India.

CANNABIS sativa.

EARLY EXPERIMENTS IN HEMP CULTIVATION .- In 1802 the Govern- CULTIVAment of India mide various experiments on an extended scale to estab-lish hemp fibre cultivation Luropean seed was imported, and farms and factories established, but figuilly abrindoned. Recourse was had to improving the cultivation of the Indian stock. The cultivation and manufacture was carried on at Mhon, Rohilkand, and Azit

European hemp-dressers the experiments abandoned.

Later the rejected stems from but the enquiry in this

> Possible Prospects

. SULTS -In spite of these disheartening results, it cannot be definitely stated that it is impossible that hemp fibre can be produced in India. The efforts alluded to were mainly directed to combining the two industries of producing resin and fibre, and

Kumaon and Garnwai grow the plant on account of its nore, and with the results of the experiments conducted at the beginning of the century before him, Dr Royle still entertained the highest hopes of ultimate success From a paper which appeared in 1839, in the Transactions of the Agri-Horti. Society of India, Vol VIII, p 15, the following passage may be reprinted, as it expresses pretty clearly Dr. Royle's view:—"This (hemp) might be cultivated in suitable situations in India, in a manner similar to that adopted in Europe, or like that practised with its substitutes in India The effect would undoubtedly be to produce a sufficiently long fibre, which would also be softer and more pliable at the same time that it retained a

extensive in Indi

20 shillings per c hemps are selling

Dr. Royle alludes to successful experiments of hemp cultivation in the plains, especially at Chittagong But in most cases, as was proved with the plant reared at Saharanpur, it is admitted that the plains crop is far inferior to that reared on the hills The opinion is therefore arrived at that

dicial to its growth, and it seems to thrive best at from 4,000 to 7,000 feet in altitude above the sea After being well prepared and freed from weeds, the ground is sown in May or lune. During the growth of the

CANNABIS satiya.

The Cultivation of Hemp in India.

CULTIVA
_TION.
For the

plants the ground is once or twice dressed, and, where necessary, the plants thinned so as to lease a few inches between each. The plants vitimately attain a height of 12—14 feet, and from September to November the crop is the contract of the contract of

the tak

for R3,357." It is commonly reported that the cultivation of the hempnarcotics is prohibited in the North-West Provinces. In an early patagraph (No. 339), it has been shown that hemp fibre would appear to be cultivated in the Godayery District

SEASON OF SON ING AND REFERSO—Messes. Duthle and Fuller remark:—"The seed is sown in May at the rate of 30 seers to the acre, and the plants are thinned out if they come up 100 closely, and are kept carefully weeded By September they will have attained a height of 12 or 14 feet. In the hemp the male and femile organs are contained in separate flowers an "" "e plants (called tho rs ix weeks before the female their seed ripens charat, which is done by rubbing the seed pods and leaves between the hands."

European Cultivation for the Fibre -- Dr. Royle and several other authors give accounts of the methods pursued in Europe in hemp culti-

almost anywhere in the temperate and sub-tropic regions of the globe, it can be made to manured and lands, where sand and clay are intim matter, are well suited Stiff cold clays are to be avoided Over-rich and the manured, soils, when well manured.

Italian Hemp 340 from Holland is most esteemed ips equal to it. "Seed from the pla appearance, yields poor fibre for the first crop or two, but Himalaya seed

appearance, yields poor fibre for the first crop or two, but Himalaya seed is inferior to none." Constant change of seed is recommended and good seed is described as plump and of a bright-grey colour.

Male Fibre

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"The fibre afforded by the male plants is tougher and better than that yielded by the females; it is usual to divide the harvest. The males are gathered as soon as they have shed their pollen, about 12 weeks after sowing; each is uprooted singly, care being taken not to injure the stem.

"The fibre afforded by the male plants is tougher and better than that yielded by the fibre sowing; each is uprooted singly, care being taken not to injure the stem."

"The fibre afforded by the male plants is tougher and better than that yielded by the fibre afforded by the male plants is tougher and better than that yielded by the fibre afforded by the male plants is tougher and better than that yielded by the fibre afforded by the male plants is tougher and better than that yielded by the fibre afforded by the fibre affor

"The fibre is separated either by retting or by breaking and scutching" (Spons' Energel).

Properties and Uses of Cannabis suitea

ECONOMIC PROPERTIES

From the STPMS, LPAVES, OF PLOWFRS, and even the PRUITS, a RESIN OUS PETRICT, of a powerful narcotic character, may be prepared. The INNER BARK affords the valuable FIBRE HEMI. The SEEDS are occa-

The Narcotic-Indian Hemp.

CANNABIS sativa.

GANJA.

342

Flat.

343

sionally eaten; they are much valued for feeding birds. An oil is expressed from them which is of some importance, but can scarcely be called commercial.

RESIN OR NARCOTIC.

There are primarily three forms of this substance, but under each there exist also local modifications, special preparations from these, and adulterants or initiations. The three forms are known as Gánjá, Charas, and Bháng. Gánjá is the female flowering tops with the resinous exudation on these: Charas the resinous substance found on the leaves, young twigs, bark of the stem, and even on the young fruits: Bháng, the mature leaves and in some parts of India the fruits also, but not the twices.

BENGAL MANUPACTURE.

(111) GANAL—This is known in the trade as consisting mainly of two forms: Flat Gánjá and Round Gánjá Speaking of the manufacture of gánjá in Bengal Mr. Hem Ohunder Kerr says:—"In February and March, when ganja attains its maturity, the cultivator proceeds to make arrangements for reaping the crop and preparing the drug. His first step is to present himself to the supervisor, show him the license under which he has grown the crop, and obtain his permission to remove the crop from the field." For flat gánjá, cutting of the plants commences in the morning; for round gánjá, in healternoon, and by the Hindus Thursday and by the Muhammadans Friday, is considered the þest day for com-

and by the Muhammadans Friday, is considered the best day for commencing operations.

Flat-Gānjā.—The stems are cut with a sickle about 6 inches above ground, and are tied together by their ends and placed across a bamboo,

iration
1 or 2
20ut a
If by

twigs, are carefully picked out and first retained for next year's crop.

size. These are arranged on a mat in a circular form, with their points directed towards the centre and overlapping each other. The circle thus formed and the first new property.

firmly among the flowers in the desired form. Fresh twigs are then

mats are spread and the flowering twigs beaten two and two together so as to shake off the leaves or any fruits that may still remain and are re-arranged in a new circle, so that what was on the top before now forms the bottom

CANNABIS sativa.

The Narcotic-Indian Hemp.

GANJA.

layer of the new circle. The treading is repeated stage by stage until the stack is again covered by the mats, and men take up their inexplicable seat on the top. After this each twig is trodden upon separately, being placed for that purpose on a canvas cloth; by sunset the process is completed for the day's manufacture. Next day the treading is repeated with slight modifications of little importance in the peculiar method followed. The ultimate result of all this labour is that the resin and flowers are firmly consolidated into flat patches near the apex of the twigs, and the leaves and fruit vessels (if such exist) carefully removed.

The twigs are then carried to the homestead and stacked, with the tips pointing inwards, and the stems thus exposed to be dried; when completed,

the top of the stack is carefully covered in with mats.

Round. 344

Round Ginja—In the manufacture of round ginjä greater care is bestowed. A larger amount of the twigs and leaves are rejected. Instead of being arranged in a circle, they are placed on the ground in a straight line and just below a bamboo bar, on which the men rest their arms and thus support themselves while treading. Instead, however, of tramping, they now roll twig by twig 50 as to force the resinous matter into the form of a thin sausage shape near the apec of the twig. This rolling is repeated several times, and the twigs even taken up in the hands and individually trummed, superfluous leaves, &c., being picked out, and when loose the resin pressed into the desired form by the fingers.

Chur or rora 345 Ganyá powder or chir — When perfectly dry both the flat and round gányá are next bailed in a prescribed manner, and during this operationa certain amount of loose particles of the resinous matter falls off; this is known locally as chir Under the excise rules a separate rate is fixed for chir. It is held to be more powerful than round gányá, and therefore the duty on it is Ri as compared with R3 a seer on round gányá. The fagments which constitute chir cannot be made to adhere, and although prepared at one and the same time with the pressed or rolled gányá and from the self-same plants, it is probable that these fragments exist in a sightly different chemical state, and probably more nearly resemble charas than gányá. Chár is also known under the name of rorá

Mr. E. T. Akkinson (in his Himilayan District, p. 761) says of the ganja of the N-V. Provinces: "The ganja produced in Kumaon and Garhwalis considered of little value, and is not, so far as I am asare, exported. The ganja consumed locally is imported from the lower districts. Two sorts of ganja are sold in these Provinces—the pattar and the bitichar. The pattar is imported chiefly from Holkar's territories and is of quality inferior to the Bengal ganja. It is purchased at from R5 to 6 a maund in Indut in the rough state," and "pays a duty of about 4 annay per maund on exportation to British territory." It is sold crivil at from R5 to 4 a seer. The bitischer variety is imported from

Lower Bengal, and is sold at Rio to 12 a secr.

BOMBAY AND THE CENTRAL PROVINCES.

OF GANJA

Although definite information cannot at present be obtained as to the details of the process of manufacture of génjá as followed in the Central Provinces and Bombay, it is probable that it differs but slightly from that narrated above as pursued in Bengal. Dr. Irvings, in his flateria Helica of Patina, however, informs us that there are two imitations of gánjá or perhaps more correctly, of chargs. The one is obtained by evaporation the expressed junc of the plant, and the other an extract obtained by boiling the whole plant. Tow hat extent these adulterants are sold separately or mixed with the pure drug it is difficult to learn, but as far as Bengal is concerved, it may knidghally be stated that adulteration can

Expressed Julce 346 Decoction 347

The Narcotic-Indian Hemp.

CANNABIS sativa.

alone take place when the intoxicant reaches the hands of the dealer. In the golas it is quite pure.

The mention of chur, and of the extracts referred to by Dr. Irving, naturally lead to the consideration of—

(ma) Charas.—This may be defined as the resinous substance which naturally exudes from the leaves, stems, and fruits of the hemp plant (see No 355) in more northern or higher regions where the plant is accordingly grown in a colder climate than that of the ganja-producing districts of the plams. In another page (No 377) it will be seen that Dr. Aitchison says that the resin collected from the leaves and flowers is in Turkis-

CHARAS. 348

tan called nasha—the charas of trade Before being exported it is, howpractically two writer that at

by beating, the noweing, twigs over a coarse conton coils spread on the ground. The crop is reaped about November and the powder stored in small 24th Bogs. About May these are sold to the traders, who cut the bags open and spread out the now partially agglutinated powder on cloths under the sun. It softens and deepens in colour and is hard pressed into bags or bales 13 maunds in weight (1 half pony-load ready for exportation). The quality is judged of by the 'muonit of oil scen through the degree of transparency in a fragment flattened on the hand until it is of the thickness of paper, or by rolling a small piece into a cord and exposing it to the sun for a few minutes. The oil is sucked on to the surface of the cord, the charas deepens in colour, but if pure, on being broken, is seen to be composed of minute granules of the appearance of pure steel. With age the oilness is sucked out of the charas is only being exposed, it is then valueless. Charas is in Varkand adulterated with Innseed oil and a powder of the homp leaves

From the above description it would appear as if Yarkand charat was not the resinous exudation from the leaves and stems, as in Sind, Kash-

MOMEN

commonly reported that a very fine quality of charas known as momes as similarly prepared (See Church's Ed., Johnston's Chemistry of Common) P. G'- tto, Residency that the word

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of the capital Speaking of the modes of collecting charas as practised in Nep3l, Dr Gimlette adds. "I have been unable to verify the accounts of the collection of charas by means of leither costs were by men who run

mes e Nepal 350

CANNABI sativa,	
MOMEA.	

The Narcotic-Indian Hemp.

given internally in cases of wounds and ulcers along with phi; dose one masha." It is noteworthy, in connection with Dr. Oilmeliu's discovery regarding human fat used in the manufacture of Nepál moma, that amongst the ignorant classes of Northern India a superstition prevails that they may be captured and carried off to some distant land to be made into nomen. This fact has been alluded to by various officers in their reports on the objections raised by the poorer classes against emigration. Speaking of this subject, Colonel D. G. Pitcher, in a report dated June 1852, writes: "T"."

Mumiai 351 te 1 0. trateite).

roncously applied

be added that the

which apparently

Economic Geology,

d that there are

several localities where bituminous products occur, as they are commonly sold as drugs in the bazars of that country. According to Gaptain Hutton (Cai. Jour., Nat. Hist., Vol. VI., 601), a mineral puch called nuturial by the natives, which is used for external application, is found in the Shah Makhsud range. A substance supposed to be this same nuturial, otherwise called Rock Chetny, which was obtained by Lieutenant Oonolly as an exudation from a fissure in a rock in Ghazni, was analysed by Mr. Peddington, who concluded, in spite of its savoury name, that it was composed of the excreta of birds, more probably of bats, mixed with saits of hime. There was no trace of bitumen or sulphur. In fact, this to the reputed dispared to the control of the co

Momyal.

ally of clay, which
of a lamp, giving
devoted to Panjáb
hide speaking of a
ality a dry mass of
tar. Real monyai is said to be rarely met with; it is supposed to be of
great efficacy in healing bones, and is in fact an "Osteocolia." It is sauf

momyai as a black

353

to come from Persia, where it exudes and floats on the surface of a certain was self.

Forests, or allied ound to

354

exude from a crack on the face of a high rock.

There are thus numerous allusions to a substance or substances known in the bazars of India under the name momen, but in none of the published accounts of this drug is there the sightest reference to its being a product of Indian hemp, although, in the early literature of that narcout, it is repeatedly stated that a pure wavy form of charas obtained from Nepál is sold under the name of momen.

Charas from Sind. 355 Central India.

- men to lad in ... norted

The Narcotic-Indian Hemp.	CANNABIS sativa.
In either case the charar thus collected is scraped off and made into the	CHARAS. Trans II ma- laya. 357
	Garda or Panjab
When the tháng has been gathered and placed in a store-house as soon	
	359
to the tips when an the dust has been shaken a dust falls down which is needed to the cloth, the cloth is iself taken out and shaken. a dust falls down which is needed she tint, Listly, the configuration of the drug, which consists of the miture leaves and in some parts of India of the fruits also. The results apparently not extracted from these and sold or used in this form; the leaves are directly employed in the manufacture of the preparations in which blading constitutes the form of the narrouse. According to some which blading constitutes the form of the narrouse. According to some simple the constitution of the provinces where duty is sell and a nanis (except in the N-W. Provinces) where this is not the case, is of considerable importance when the disproportion in the revenue credited to Government from this article is taken into consideration.	bhang, 360
IADIAN PREPARATIONS IRON HEMP.	Smoking mixtures, 361 Hashish, 362 Majun, 363
	PRICES,
scrping duty. This is mainly due to the and the	
C. 363	at .

CANNABIS sativa.

The Hemp Fibre of India,

Bedding for Cattle. of affairs which prevails over a great part of India, and, indeed, on the lower slopes of the Himálaya and up to an altitude of 8,000 feet, the plant is often so plentiful as to be extensively used as bedding for cattle. The greatest difficulty exists, therefore, in regulating the consumption of bling, but practically no such difficulty exists with regard to ginigh and charas. The last-mentioned narcotics can be produced only from the cultivated plant, and the consumption can therefore be regulated by law. The Excise Act provides that licensed persons may cultivate the plant, prepare the narcotics, and retail these to the consumer. The right to tend is soid by public auction, a person purchasing thereby the sole right, for one year, to all or so many of the shops in a district. Any person, other than a licensed dealer, having in his possession more than a very small quantity at one time is liable to prosecution and fine. This system of farming the wholesale and retail shops custs all over India,—Madras being an exception to the rule, since in South India, no revenue whatever is credited to Government from these drugs.

The administrative arrangements which are made in each Province for levying excise uses on hemp will be found under the heading Narcotics.

THE FIBRE-HEMP.

Arrangements. FIBRE 364

Excise

When Mature.

Lignification.

Experiments to be performed in India.

The reader is referred to the account given of the cultivation of the hemp plant in a preceding page. It will there be found that a considerable amount of information has been given as to the early experiments made to extend the cultivation in India of Cannable sativa as a source of fibre; a possible still further development has also, to a certain extent, been dealt with. It has been urged that the regions where the plant is grown for its narcotic, ganga, should be carefully distinguished from those where the plant may be found to form fibre. But an equally important fact remains to be investigated and thereafter clearly kept in view, namely, the age of the plant and season of the year when the fibre is at its best, in both the temperate and tropical regions of India. It cannot be discussed that the defects complained of in many of the reports on Indian hemp cultivation, against the quality of the fibre produced, are traceable to ignorance as to the period when lightfication is reached by the Indian plant. The season of sowing, period of repeating, and modes of culture, practised in Europe have, apparently, been forced on the plant in India, and the suggestion is accordingly offered that the brittle character com-plained of, against the resulting fibre, may have been due to the fact of the plant reaching in India the mature state of the fibre at an earlier stage of its growth than in European countries. Thus, for example, it is reported that the plants experimented with on the plains of India, at Saharanpur, grew vigorously, attained a height of 12 feet, and give every promise of proving successful. When reaped, Dr. Falconer, however, reported that "the hemp-fibre did not retain the strength or flexibility which characterise it in the Himalayas." Similar results were ilculantly which characterise it in the rimaryas. Similar testing obtained at Agra and in various parts of Bengal. The chemistry of fibre and of the process of fibre-forming within the plant has, during recent years, reached a high development. To arrive at a definite understanding as to whether the plants of India can or cannot produce good hemp. it would be necessary to carry out a senes of systematic experiments in certain selected districts in each province. The seed would have to be sown and the plant cultivated according to a uniform and pre-arranged plan. From a certain stage, say after the plants had attained a height of two feet, a certain number of the plants from each field would have to be rescroscopically and chemically examined once a formight, right through

The Hemn Fibre of India.

CANNABIS sativa. TIRRE

their subsequent growth, or until in each locality the period when lightfication was reached by the plants had been determined. It would also be

nn as lia on H

to the present day, the experiments which have been made have either failed to discover such regions or were imperfectly conducted, for, with the exception of certain limited tracts of the Himálayas, no part of the plains of India can be said to have been discovered in which there is the least hope of hemp or flax cultivation becoming of much importance. (See

remarks as to hemp in Godavery District No 339).

In portions of the North-West Himálaya the hemp plant has been cultivated for its fibre for a very long time Mr. Atkinson gives a brief but practical account of this industry in his Himalayan Districts "The possibility," says that author, "of attaining success in the cultivation of hemp in these provinces was pointed out by Dr. Royburgh as early as 1800, and on the cession of these provinces, skilled Europeans were sent to carry on experiments in the Muradabad and Gorakhour districts. In Garhwal and Kumaon its cultivation was encouraged, and for many years the East India Company procured a portion of its annual investment from the Kumaon hills in the shape of hemp.' With the abolition of the Company's trade the cultivation languished and is now entirely deposite the cultivation languished and is now small."

> fibre of these prov-Separation of Fibre.

water to promote), on being taken

hy hais ma potasi

from 1 used for the swing bridges over hill-streams. The cloth makes an admirable material for sacks, and is largely used in the grain trade on the Nepal frontier, and latterly, in the export of potatoes from Kumaon. It also

plat t is superior to that obtained from the female. It is urged that particular afficient for the fact that are the form of the fibre get wet, it is certain to heat and get almost totally spoiled. The method of platting the fibre into long tails as pursued by the hill tribes of India lessens the value of the fibre very much, since it increases the labour in

mai

numerous substitutes for it which are often commercially grouped with the true article. Thus, for example, we have in India Sunn-hemp (Crotalaria)

120

sativa.

The Hemp Fibre of India.

roog! Inkhatana kama /alaa (********************************) (Sann comis, such canadensis, and U. EUROPEA.

EUROPEAN HEMP. 366

place among . became an article of extensive demand, nearly every country in the world

the fibre from the outer layer of the cocoanut), Manilla-hemp, cotton, and sunn-hemp. Italy produces the finest hemp; France is perhaps next in importance, then Great Britain, Servia, Germany, and of Asiatic countries China is reputed to produce good hemp.

INDIAN FOREIGN TRADE IN "HEMP."

The following figures as to the value of the Indian trade in "hemp"

Trade and Navivation of if the imports of raw-hemp the exports Sunn-hemp :-

Foreign Foreign

Raw Remp 367

Manufac-368

Cordage. 369

-				Hemp imported.	Hemp exported.	exported.
1				R	R	R
j.	Manufactured Hemp (excluding cordage).	1851-82 1882-83 1893-84 1854-85 1885-86 1891-82 1892-83 1833-84 1834-85 1855-86 1831-82		1,10,875 1,82,993 1,70,705 2,14,118 1,90,052 10,179 27,999 37,570 41,356 42,810 3,22,485 4,31,693 3,90,584 3,52,4319	 4,182 8,857 4,548 150 223 24,886 15,556 11,198 13,076 7,437	5,59,112 4,30,325 6,85,316 5,82,679 9,89,823 1,409 3,176 6,510 3,129 3,255 3,255,173 2,84,166 4,92,63 3,53,339 3,25,320
			~~~			

Foreign Trade in Manufactured and Unmanufactured Hemp, excluding Cordage.

				Imports.	and re-exports.					
}									Value.	Value.
1551-53 1547-53 1547-53 1547-53 1547-53	:	:	: :	:	:	:	:	: ;	† ₂	R 5,64,703 4,42,353 6,76,374 5,85,033 9,92,333

The	Indian	Hemp

#### CANNABIS sativa.

Detail of Imports, 1885-86.

Prevince into which imported.					Country whence imported.	Value.
:	:	:		R 1,33 235 1,01,600 1,183 2,544	United Kingdom Chia Philipines Straits Settlements Other Countries	R 83,431 1,23,474 2,609 17,827 11,521 2,35,862
	:	: :	: : :		R	R  1,33 235 1,61,600 China 1,183 Philipmes 2,844 Other Countries.

FIBRE. Imports. 370

Det nil of Exports, 1885-86.

Exports.

Province from which exported.					Value.	Country to which exported	Value.
Bengal Bombay Madras	:	:	:	:	R 3,11,551 6,31,444 42,358	United Kingdom Belgium Persia Arabia Other Countries	R 6,75,607 2,56,566 11,435 15,698 30,044
		Тот	FAL		9.92.353	TOTAL	9,92,353

37I

It has been found impossible to give the quantities, since the raw fibre is expressed in weight, cloth in pieces, and rope in balls of various lengths and weights.

#### OIL.

Oil.—The seeds, when expressed, yield a pale, limpid oil. They con"its oil is at first greensh or
hen it is exposed to the air
mild. It is, however, said to
d boiled oil, and or this ac-

HEMP SEED

gravity of 0 9252 at 15 C.; it thickens at -15°C, and solidifies at -27 fC. It dissolves in boiling hot water and in 30 parts of cold

MEDICINE.

alcohol

MEDICINE.

.

375

CANNABIS sativa.

The Indian Hemp as a Dreg.

MEDICINE.

tice has greatly decreased of late years owing to a feeling of insecurity as to the quality of the article. It is commonly recorded that no reliance can be put upon the uniformity in strength. The writer, at a meeting of the Royal Pharmaceutical Society of Great Britain, recently expressed the opemon that the heavy fiscal restrictions now imposed on Bengal rania had, in all probability, diverted the export trade from Bengal to Bombay, so that, instead of the carefully-cultivated Bengal article finding its way to Europe, the much inferior but infinitely cheaper ganja of Bombay and the Central Provinces was, in all probability, that which was now used in European pharmacy. The Chemist and Druggist, commenting on this subject shortly after, recommended the suggestion as worthy of attention, and added: "The price of Bengal gánjá máy be prohibitive, but the whole subject should be considered by authorities," There nould seem little doubt that the high reputation the drug once enjoyed might be recovered by greater care in selecting the article, but there is perhaps no other commodity in India that is produced in a larger number of forms and qualities, or which in the hands of the retail dealer is subjected to a greater degree of adulteration. The only guarantee an exporter can have is to purchase his ganja direct from the Government golds of Bengal, not even allowing the article to pass through the hands of a wholesale ganja-dealer or "middle-man" of any kind. If the article be shipped under a permit direct from the gold it is believed little complaint would be raised as to the uniformity in strength, but none but that which is registered as of the first quality should be purchased for medicinal purposes. From what the writer has been able to learn it would be even preferable to use for European pharmacy the char or the dust obtained on packing and handling round ganga rather than round ganga itself; flat ganga should be resorted to with caution, and charas, or momea, should never be employed, nor round ganta in which ripe fruits are found with the flower heads.

Chur or Round Ganja best sulted for Pharmacy. Flat Ganja and Charas should be avolded.

Medicinal Properties and Uses of Indian Hump.—The Pharmacopeia of India describes the drug as primarily stimulant, and secondarily anodyne, sedative, and antispasmodic. It is also said to be narcolic, diurctic, and partunfacient. It has been used with advantage in tetanus, hydrophobia, delinium tremes, ebretas, infantile convulsions, various forms of neuralgia, and other nervous affections. It has also been employed in cholera, menorrhagia and uterine heumorrhage, theumatusin, hay fever, asthma, cardiac functional derangement, and skin diseases attended with much pain, and prurities. In Ingering and protracted labours depending upon atony of the uterus, it has been employed with the view of inducing uterine confractions.

It is admitted by most Indian physicians to be of special merit in the treatment of tetanus and cholera and has not the injurious after-effects (constipation and loss of appetite) which but too frequently result from the use of opium. Its action is, however, very similar to that of opium, and it is accordingly stated that a habitual opium-eater may take large

quantities of hemp without infurious consequences.

Sir William O'Shaughnessy was the first European writer to draw prominent attention to the peculiar properties and actions of the hemp-narcoures. He experimented with these in Calcutta and published his results. The reader is referred to his Bengal Dispensatory and to a "Memoir on the preparations of Indian Hemp" in the Transactions of Medical and Physical Society of Calcutta for 1839, and to two papers in the Journal of the Annie Society, Vol. VIII., of the same year. Shortly after the appearance of these most exhaustive accounts, the drug began to be experimented with in Europe.

The Indian Hemp as a Drug.	CANNABIS sativa,
int of in, in, nur.	d.
Sind is that known as bubakai, from the town of Bubak near lake Manchhar.	.1
He further adds that the mdjim of Sind is made up of some 20 to 30 dif- ferent ingredients, of which datura and opium are frequent. In some parts of India a beer is brewed with bling, and this, together with bling itself, mdjim and other preparations, are often employed in Native phar-	1
Professor Civistics on Miledal forms for a 1 of the remarks, deris-	
e prin, obtain	
in summent doses. The diamonity is, to be always sure of the quanty of the extract, or rather of the $ganja$ from which the extract is obtained. I	Uniformity in quality.
(choras) The at by th	
Makkean, "the leaves make a good juice applied to the head removes ear it allays pain and destroys we	
in the second of the second	
are the subject of oduces a ravenous that of the liver, orgetfulness of all ion, that the be-	
The content of the co	
Sanskrit writers, "the n being boiled in milk C. 376	Leaves, 376

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# CANNABIS sativa. MEDICINE.

# The Indian Hemp as a Drug,

before use. They are regarded as heating, digestive, astringent, and nar-

cotic" "In sleeplessness, the powder of the fried leaves is given in suit-

Dysentery.

able doses for inducing sleep and removing pain " Special Opinions - "Used as anodyne, antispasmodic, diuretic, leaves may be employed in dose of 20 grains" (Assistant Surgeon Nebal Sing, Shaharanbur) "During the last twelve months I have used Can

Affections of the eye.

nabis sativa with great success in the treatment of acute dysentery; similar results were obtained by other medical officers of this station, who tried it at my request The dose was, of the tincture 15 or 20 m three times a day (Surgeon S 7 Rennie, Campore). "I have found a poultice of the bruised fresh leaves, slightly warmed, very useful in affections of the eye, attended with photophobea. Natives also use the poultice in piles" (Ainstant Surgeon Bhagwan Dass (2nd), Punjab). "The assix collected from the leaves and flowers in Turkestan is called Nasha, and this ought to be the

NASHA. 377

Charas of the trade, but it is terribly adulterated. The plant is called in Turkestan kander, and the oil, kander yak. The one extracted from the seed is in Kashmir considered as a valuable remedy, applied by rubbing in rheumatism" (Surgeon-Major J. E. T. Artchison, Simla) 'Used in the form of 'sidhi,' in small quantities, it is a very good stomachic tonic. useful in atonic dyspepsis and diarrhea. In large quantities exhibitant at first, depressent subsequently Long continued use of gang is a prominent cause of insantly (Coul Surgeon D Basu, Faradaps) a Used

rubbed in with cardamom and other spices to all my prin, taken as a drink habitually by many for intoxicating purposes, may be used as an anodyne; it increases appetite, is an aphrodisiac, and increases the activity of the

Oil used in Rheumausm.

to produce sleep in certain cases in which opium is contra-indicated. It does not induce nausea, constipation, or headache as opium does able as a remedy for sick headache, and especially in preventing such 1 tacks It removes the nervous effects of a malady. Useful in malarial, periodical neuralgias Valuable in the treatment of the sleeplessness and restlessness of acute mania, in whooping-cough, and in asthma-Acuto Mania in dysuria, and in relieving pain in dysmenorrhoea" (Dr E G Russells Superentendent, Asylums, at Presidency General Hospital, Calcutta) "Commonly used is a narcotic, a few grains of the leaves called nadhi

brain, producing better flow of thoughts, and deep meditation, but often wild revenes and causeless laughter. A small quantity of the leaves, mixed with other drugs and spices, forms in useful compound in diarrhos and indigestion of children" (Assistant Surgeon Shio Chunder Bhatteriagri, Chanda, Central Fromices) "The leaves, which are known as bliding, are used to check direction; an extract is prepared from them; if is made into confection and used for narcotic purposes" (Surgeon Major Robb, Ciril Surgeon, Ahmadabad) "Used for asthma and in tetanus dose I to 2 grains, with sugar well fried in ghi and mixed with black pepper, given, in cases of chronic diarrheer, with poppy seeds in dysentery, with scalarida in hysteria" (Surgeon W Birren, Blug, Cutch) "Very often used by natives in some paris of this Presidency as an aphrodisiae and I believe in some cases successfully, in the form of Majun, sea hird of pill-mass containing various drugs" (Surgeon D. N. Parakh,

Hysteria.

Orehids.

Asthma. Cereare code Remay) 'The leaves made into a poultice used in orchitis, also dried leaves warmed and used for fomentations" (Civil Surgeon S. M. Sur-"thed frequently by all hospital assistants part core, Hurshelahal) tularly for ashma and other paroxymal affections. It cases of clean cole I have found the extract in one-grain doses with £ grain of I pecate to greaters worderful effects." (Dayal Caundar Voorse, Campbell Meli al S. k. l., Ses'lah, Ca'entra). More commonly used in this country is produce intra cating effects than for its med cinal properties in smaller doses

#### The Indian Hemp as a Drug.

CANNABIS sativa MEDICINE Ague Fits

Impotence

COMPO

(Dr G Price, Civil Surgeon, Shahabad) "It is also used in the form

perma it acts chola

chola gogue" (Civil Surgeon F H Thornton, B A, M B, Monghir) "Dried tender leaves and flowering tops with sugar, black pepper powder, and with or without opium, proves highly beneficial in dysentery" (Civil Surgeon E W Sarings, Rajamindry, Godaver: District)

Chemical Composition —" The most interesting constituents of hemp,

from a medical point of view, are the Resin and Volatile Oil

"The former was first obtained in a state of comparative purity by T and H Sm thin 1846 It is a brown amorphous solid, burning with a bright white flame and leaving no ash. It has a very potent action when taken internally, two-thirds of a grain acting as a powerful narcotic and one grain producing complete intoxication. From the experiments of Messrs. Smith it seems impossible to doubt that to this resin the ener-

getic effects of Cannabis are mainly due
"When water is repeatedly distilled from considerable quantities of
hemp, fresh lots of the latter being used for each operation, a volatile oil

lighter than water is obtained together with ammonia. This oil, according to the observations of Personne (1857) is amber-coloured, and has an oppressive hemp like smell. It sometimes deposits an abundance of small crystals. With due precautions it may be separated into two bodies, the one of which named by Personne Cannobene is liquid and colourless, with the formula C_HH_∞, the other which is called Hydrade of Cannobene, is a solid, separating from alcohol in platy crystals to which Personne assigns formula C_HH_∞. He asserts that Cannobene has indubitably a physiological action, and even claims it as the sole active principle of hemp. Its vapour he states to produce when breathed a singular sensation of shuddering, a desire of locomotion, followed by prostration and sometimes syncope. Bohling in 1840 observed similar effects from the oil which he obtained from the Iresh herb, just after flowering, to the extent of o 3 per cent.

"It remains to be proved whether an alkaloid is present in hemp, as

suggested by Preobraschensky

The other constituents of hemp are those commonly occurring in other plants The leaves yield nearly 20 per cent of ash
"As to the resin of Indi

nitric acid, converted it into substance may, they say, b in methylic alcohol. It mel composition, it is neutral from purified resin of chara Pharmacog, page 549)

Dr Dymock (in his 2nd Ed of the Vateria Medica of Western India) goes into considerable detail on the chemistry of this drug Preobras chensky discovered in China haselistich, a volatile alkaloid which he believed to be identical with nicoune Dragendroff and Marquiss

Cannabene 378

these published results of the chemical investigation of the narcotic resin

CANOES.

### The Indian Hemp Canoes.

of Caunabis sativa, Drs. Warden and Waddell of Calcutta have failed to

oil contained phenol, ammonia, and several other of the usual products of destructive distillation,

"The motine-like principle contained in this oil appeared to be an alkaloid. It formed salts which evolved a strong nicotine-like odout when acted on by alkalies. But physiologically it was found to be inert, and therefore was evidently not identical with nicotine" (Ind. Med. Gas., Dec. 1884).

FOOD.

FOOD. 379

Food,-Messrs. Duthie and Fuller, writing about the Himálayan tracts within the North-Western Provinces, say that the seed is not uncommonly roasted and eaten by the hill-men, and that after the oil is expressed the oil-cake is given to their cattle. Dr. Stewart writes that on the Sutler the seeds are roasted and eaten in small quantities with wheat.

#### DOMESTIC AND INDUSTRIAL USES.

DOMESTIC. 380

38z

Cannabic Composition .- "This material for architectural decoration is described by Mr. B. Albans to have a basis of hemp amalgamated with resinous substances, carefully prepared and worked into sheets of large dimensions. Ornaments in high relief and with great sharpness of detail are obtained by pressure of metal discs, and they are of less than half the weight of papier-mache ornaments, sufficiently thin and elastic to be adapted to wall surfaces, bearing blows of the hammer and resisting all ordinary actions of heat and cold without change of form. Its weather qualities have been severely tried in Europe, as for coverings of roofs, &c., remaining exposed without injury.

This composition is of Italian origin, and in Italy it has been employed for panels, frames, and centres. It is well fitted to receive bronze, paint, or varnish; the material is so hard as to allow gold to be burnished after

gilding the ornaments made of it" (Urc, I., 611).

# CANOES.

Sec Boats, Vol. 1., B. 548.

TIMBERS USED FOR CANOES, DUG-OUTS, TROUGHS, WATER-PIPES, DRINKING CUPS. &c.

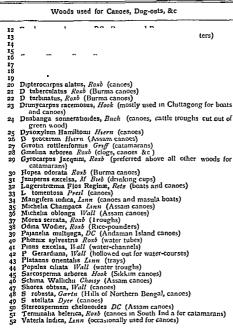
1. Acer casium, Wall. (drinking cups made in Tibet).
2. A. obler : " !! !! !! !! !!

- 3. A. pict 4. Adına c
- 7. Amoore
- 9. .

- on used for Canoest.
- ro. 11. Exemutia regulasa, wata, (Lepchas make cups, bowls, and tobacco-boxes).

CANSCORA

decussata



### CANSCORA, Lam, Gen Pl, II, 811

Canscora decussata, R & Scb., Fl Br Ind., IV., 104, Bol Mag, 1 3066, Gentianacez

Syn PLADERA DECUSSATA Rath, FI Ind., Ed. C.B. C. 135
Vern Manthhalul Hind Danhun, Bevo, Shun khapashaffi Cutcu,
Shun khapashaffi Sans
Sans T. John Manthhalul Sans S. Sans S.

C. 382

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CANTI	MILLE
didyn	num.

### Cantharides; Canthinm

MEDICINE 383

Habitat -Common throughout Index from the Himalaya to Burma, recending to 4 000 feet, is abundant in the plains of Bengal and not un-

common in Ceylon Medicine - This plant is regarded as faxative, alterative, and tone, and is much praised as a nervine tonic. Used in insansity, epilepsy, and nervous del fin Ila fenel

--

ın dosce of the c

Mel Hint 201).

taken

Special Opinions - 6" This deserves a trial" (Surgean-Major C 7 Mckenna) "Laxative, tonic, expectorant" (Dr W Barren, Bhuy, Cutch), Canscora diffusa, Br , Il Br. Ind , IV , 103, Wight, Ic , 1 1327 (not

Syn -Pladera vironta, Roed, Fl Int. Ed C B C, 134

Vern - Ayouk pan, Burn References -Thrailes, Fn Ceylon Pl , 204; Dals and Gibs , Bomb Fl , 158 ; Lorgt, Hort Sub Cal , 520 Habitat -Common throughout India, ascending to 4,000 feet, from

Kumion and Bhutan to Ceslon and Tenasserim Medicine - Used as a substitute for C. decussata

385 386 C. sessiliflora, Roem and Sch , Fl Br Ind , IV., 104

# CANTHARIS, Latreille

Cantharis vesicatoria, Latrelle, Coleopter

CANTHARIDES, BLISTERING BFFTLE, SPANISH PLIES, Eng. MOUCHES DESPAGNE Fr SPANISCHE FLIEGEN, Germ, CANTERELLE, It / HISCHPANSKIE MUCHI, Rus , CAN THARIDES, SO

References --Pharm Ind , 274; U.S. Dispens 15th E? 347 Spons, Encyclop , 796 Balfour, Cyclop , Ure 2 Dic of Arts and Manufactures Habitat -A dried insect imported into India and sold by chemists. For indigenous insects used as substitutes see Mylabris cichorn, Fabr

# CANTHIUM, Lam, Fl Br Ind, III, 131.

The Genera Plantarum reduces the above genus to PLECTRONIA Linn , but CANTHIUM has been retained in the Flora of British India, which puts PLECTRONIA (in part) under CANTHIUM

Canthium didymum, Roxb , Fl Br Ind , III , 132 , RUBIACER

Vetu -Garbha gojha Santal Yerkols, Tam Yellal porawa mara, Gal kara ida Sing Kan References -- Roxb Fl Ind Ed CBC 180 Kurs Fl Burm, II, 359 Thwailes En Ceyl Pl, 152 Bom Gas XV 65

Habitat -A shrub or small tree found in the S'kkim Himálaya at an altitude of 1,500 feet and d stributed east to the Khasia and Jantea mountains It also is met with in Chutia Nagpur and in the Western Peninsula from the Concan southwards to the Malayan Peninsula and Ceylon

C. 390

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MEDICINE

387

Blistering Insect

389

300

CANVAS.

MEDICINE. 301

Medicine.—Bark used by the Santals in fever (Rev. A. Campell). Structure of the Wood.—Hard, here, and close-grained; sellowish, with central masses of block, (fromb. Gar.) His is very much like the description of the wood, as given by Brandis and by Lisboa for C. embellatum.	TIMBER.
Canthium parviflorum, Lank; Fl. Br. Ind., III., 136  Syn - Wefera teerandra, Willd.; Kanden rara in Rheede, Hort. Mol. 7. 1, 20	393
Vern.—hirni, Boun ; Karai-cheidi, Tau.; Tajiron kara, Mal.; Balusu, chetia, balsu, Tel. (Ainslip), hara, Sino	ļ
References —Rest. Fl. Ind., Ed. C. R. C., 179, Gamile, Man Timb., 230, Annlie, Mar Med. II. (*12) Dymack, Mat Med. W. Ind., 173, and 164, 164, 164, 164, 164, 165, 166, 167, 168, 168, 168, 168, 168, 168, 168, 168	
Habitat.—A shrubby plant met with at altitudes of 4,000 feet, in the Western Peninsula from the Concan southwards to Ceylon.	
Medicine Alashe says "A decoction of the edible leaves, as well as	MEDICINE 394
•	FOOD
• • •	395 TIMBER
C. umbellatum, Wight, Ic , t. 1034; Fl. Br. Ind., III , 132.	390 397
SynPlectrona Didyma, Benth. & Hook ; Brandis, For Fl.	397
Vern.—Arsul, Bonn; Neckanie, nalla, balsa, Tam. & Tel.; Abalu, Kan; Tolan, Uriya	
References Brandis For. Fl., 776, Bedd., Flor Sylv., 221; Dals & Gibs, Bomb Fl., 113, Gamble, Man Timb., 230 (under Plectonia didyma, Brith & Hook); Lisboa, U. Pl., Bomb, 67	
Habitat.—An evergreen tree met with in the Western Peninsula (on the Gháts at altitudes of 4,000 to 8,000 feet) and distributed south to Tenisserim and Ava	
Structure of the Wood.—Hard, close-grained, and heavy, yellowish white or chocolate-coloured with irregular masses of black wood in the centre (Brandis) According to Gamble, the wood is grey, hard, with vers small, numerous and uniformly distributed pores, medularly ryps fine and numerous Gamble makes no mention of the irregular masses of black wood (Compare with C ddymam) Weight 57th a cubic foot. Timber is used for agricultural purposes	, timber, 398
CANVAS.	399
SAILCLOTH, Eng., KANEVAS and SEGELTUCH, Germ.; CANEVAS and TOILE-A-10ILF, Fr., ZEHDOCH, Dut; LONA, II., Port, Sp., CANEVAZA, II. Port; PARUSSINA, PARUSSNOE FOLOTNO, Rus, KITTAN, Tam., Tel	
•	

pared is employed by artists for painting on.

ĸ

30

CAPPARIS aphylia.

### Caoutchouc. The Caper-berry.

Sails are usually made with the salvages and seams of the canvas running the canvas with the salvages and seams of the canvas with the salvages and seams of

400

In India the principal seats of canvas manufacture are Pondicherry, Cuddalore, and Fravancore, where it is sold in bolts of 40 yards at from R20 to R25 the bolt; the coarser kinds selling from R8 to R15. A still coarser description of hard brown canvas is also produced in Bengal. In the Madras Presidency, excellent cotton canvas is manufactured by combining two or more threads together in the loom (Balfour, I., 572). Although originally, as styted, the term 'canvas' appears to have been restricted to a heinp or flax textile, it has been found possible to meet certain purposes of canvas by the manufacture of a fabric of jute or other pure or mixed fibres; this modern commercial textile is also designated as canvas. (See Jute and Cannabis sativa).

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### CAOUTCHOUC.

Caoutchouc is in England generally restricted to mean the pure hydrocarbon isolated from the other materials with which it forms the impure rubber of commerce. See India-rubber.

Capillare. See Adiantum Capillus-Veneris, Linn.; Filices, Vol I.

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### CAPPARIS, Linn.; Gen. Pl., I., 108.

Capparis aphylia, Roth.; Fl. Br. Ind., I, 174; CAPPARIDEE.
Vern.—Körel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kart, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.; Kartr, Behar, Bons.;
Vern.—Korel, kartr, kurrel, lete, karu, Hind.; Kartr, Behar, Bons.; Kartr, Behar, Bons.; Kartr, Bons.; Kart

and Ps.
References Paris P. 27 - --- Camilla Man

ts; Dala-Pb Pl., rm Ind, ughnesty, n, Bombvd, 130; Balfout, vatna, 41-

Habitat.-A dense, branching shrub of the Panjab, of the North-

Medicine. 403 rs in early on powder

toothache when chewed. "The plant is reckoned as heating and appenent; useful in body, truptions, and swellings, and as an antidote to posson; also in affections of the joints," Dr. Dymock says that the plant properties of C. sajinass of C. sajinass.

possesses somewhat similar properties to C. spinosa.

Special Opinions.—§ "The fruit when eaten causes obstinate constigution. It is used largely in the Harriana and Karnal districts as an

CAPPARIS

The Caper-berry.	
astringent" (Surgeon-Major C W Calthrop, Morar) "The bark is described as bitter and Inxative, and is said to be useful in inflammatory swellings" (U C Ditt, Serambore)	
Food — Dr. Stewart remarks that the buds are cooked when fresh as a	FOOD 404 Buds
•	405 Fruit. 400
year, and is eaten to an ounce or two at a time, usually with bread. The ripe fruit is generally made into pickle with mustard or other oil (Hindus are not allowed to use vinegar), to be eaten with bread." The young	Pickle.
flower-buds are preserved as pickle Special Opinions — § "The fruit is eaten" (G. A. Watson, Allahabad) "The flower-buds are made into pickle as a condiment" (Surgeon Major F. E. T. Aitchison, Simla)	Flower-buds. 408
Structure of the Wood —Light yellow, turning brown on exposure, shining, very hard and close grained, neight 53lb per cubic foot Used for small beams and rafters in roofs, for the knees of boats, for	TIMBER. 409
	Not eaten by white-ants.
burning" (Drury)	
Capparis grandis, Linn f, Fl Br. Ind, I, 176  Syn — C Bisperma, Rosh, Fl Ind, Ed C B C, 425  Vern — Pachemala ragola, Bons, Kauntel, Mar, Ieliai toarati, maram Tam, Guli treguti, ragola gullem chellu, reguti, Tat, Tarate, Kan Waghuty Mah. Hlawkan Burm References — Kurs For Fl Burm, I, 64 Gamble Man Timb, 15, Thagate, Thum Coylon Pl. 6, Dals & Glost, Bomb Fl, 10, Lisboa,	410
Habitat — A small tree of the Chanda district and of the eastern part of the Dekkan, the Eastern Ghâts and Carnatic, the Prome district in Burma, and the north-east of Ceylon	
Oil — "Yields an oil which is used in medicine and for burning" (Bomb Gas, XV, 65).  Structure of the Wood — White moderately hard durable; weight 46th per cubic foot. Much used by the natives in the Madras Presidency for plough shares and rafters. Roxburgh says it is 'heavy, hard and durable, the natives employ it for various purposes." Kure remarks that in Burnha it is regarded as good for turning.	OIL. 411 Timber. 412
C. Heyneana, Wall, Fl Br Ind, I, 174	413
Vern — Chapruke Hind References — Dals & Gibs, Bomb Fl., p, Balfour, Cyclop Habitat.—An erect shrub distributed from the South Konkan and Kantra to Trax ancore, also met with in Ceylon Medicine — The leaves are used for rheumatic pains in the joints, and the flowers are mide into a laxative drink	MEDICINE 414 Leaves. 415
C. horrida, Linn f, Fl Br Ind, I, 178, Wight, Ic, 1 173  Syn — C INVLANICA, Road, Fl Ind, Ed C B C, 435  Vett.—Ardanda Hind, Sind Diek, Ulia banta binema kinia, hid MAON; His, kareila, hidn garna, PB, Karralura, Oudni, Ka	Flowers. 416

### The Wild Caper-berries.

seplaria.	The Wild Caper-berries.
HEDICINE. Leaves 417 418 418 Fruit. 419 FOOD 100DER. 421	Goves a Corona, Assura Rosen secreta, Especial Fassor M. a. 1982.  O come allowal M. gerbane a come il time to social Manager attential tata that Manager a come il time to social Manager attential tata that Ton all other world at a feet in Manager attential tata that Ton all other world at a feet in Manager attential tata that the social manager attential manager attential tata that the social manager attential manager attention at
TIMBER.	Structure of the Wood.—Vellowish white, moderately hard; weight about 47th per cubic foot. Used as fuel
422 423	Capparis multiflora, Hoot f & Th , Fl Br Ird, I., 178.  Vera —Suntri, Neval.  References —Aurs, For Fl, Burm, I., 61; Gam'le, Man Tim's, il.  Habitat—A climbing, thorny shrub of the Lastern Himility and
Timber. 424	Upper Burmi Structure of the Wood -White, moderately hard.
425	C olacifolia, Hook f & Th ; Fl Br Ind , I , 178.
	Vern - Nash, hais, Nevat. Jhenok, Involta References - Gamble, Stan Timb, 15, if
TIMBER.	t.
426 427	C. Sepiaria, Linn, Tl. Br Ind, I, 177  Veta—Hida garna, hins, Pa; Kantá gur kámai, kiliakard, Beno; kanth kapain, Usuya, kanthár, Guy, Netla upp., Ten., dhinara, kákidani Sahs  References—Rovb, Fl Ind, Ed. C.B. C., 425, Brandis, For Fl. 155  Kure, For Fl. Burm, J. 60, Gamble Van Tumb in Thumites, Enum Coylon Pl. 16, Dala & Gist, Bomb Jh., 10, Alichicon, Cat., Pb. Pl. 10 Voret Hort Sub Cal., 73 Vurray, Drugs and 11, Sind, 54, Royle, Ill Ilim Bol, 1, 72, Baljour, Cyclog Ush bet A chub.
3	Wah tot _ A churb a a de aleace n internitiveme

medicine 428

fevers ve and Officer,

TIMBER 420 DOMESTIC 430 Structure of the Wood -White, hard, pores moderate sized.

Domestic Uses -The branches make excellent hedges.

The True Caper-berry.	CAPPARI spinosa.
Capparis spinosa, Linn.; Fl. Br. Ind , I., 173.	431
THE EDIBLE CAPER.	
Syn C. Murrayana, Graham; Wight, Ic, t 379.	
Vern.—Kabra, ber, Hind; Kábra, Ladak, Tidet, Ulta kanta, Kumaon; Kaur, karri, baurn, ber, bandar, baisar, kabri, kander, laber, barar, keri, kabra, kabarra, barar, bauri, Pa, Kalarri, Sind, Kabar, Bomb, Aabarra, kabara, Ard; Aabar, kabar, Arbar, Yeber, Pers (In Persa ii is known as Kabar, kark). Adbar, Syrikh, Kabarish, Urukish	1

Habitat.—This is the plant which affords the Caper berry of Europe It occurs in India in the central and northern parts of the Panjab and in Sind, is less frequent in Rapputana than C, aphylla

Medicine — Dr Stewart remarks that in Kangra the roots are said to be applied to sores. The author of the Makhzan-ul-Adwiya considers the root bark "to be hot and dry and to act as a detergent and astringent, and the said and th

MEDICINE. Roots. 432 Root-bark. 433 Juice. 434

Buds. 435

diameter, transversely wrinkled, grayish externally, whitish within, inodorous, and of a bitterish, somewhat acrid, and aromatic taste. It is considered durretic, and was formerly employed in obstructions of the liver and spleen, amenorrhoza, and chronic cheumatism."

Chemical Composition—"The root-bark is said to contain a neutral bitter principle of sharp irritating taste, and resembling senegin The flower-buds, distilled with water, yield a distillate having an allisaceous odour. After they have been washed with cold water, hot water extracts from them Capric acid (C₀H_wO₀), and a gelatinous substance of the Pectin group, Capric acid is sometimes found deposited on the calices of the buds in white specks having the appearance of wax (Rochleder and Blas)" (Watt's Dut', Chemistry)

Food —In Europe this furnishes the Caper. Mr. Edgeworth found the buds (prepared in the style of "Capers") to answer very well as a substitute for the European congener. In India the ripe fruit is either eaten raw or made into pickle. In Sind and in some parts of the Panjáb, a compound of oil, mustard, fenu-greek, &c, is used in pickling capers. In Ladak the leaves are eaten as greens

Fodder, The leaves and ripe fruits constitute a favourite food of goats and sheep,

CHEMISTRY.

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FOOD. 437 Berries. Pickle. 438 Leaves. 430

439 FODDER. 440

annuum.	Capsicum or Red Pepper.
441 Food. Pickie. 442	Capparis zeylanica, Linn.; Fl. Br. Ind., I., 174.  Syn.—C. Acuminata, Rash., C. Brevishina, Dc. Vern.—Relo-kera, Beno; a duthoondy hai, Tan. References.—Voigt, Hort Sub. Cal., 741 Dals. & Gibs., Bomb. Fl., 9  Balfour, Cyclop.  Habitat.—Common in the Carnatic and Malabar, occasional in the Western Dekkan and in the drier parts of Ceylon. Food.—The green fruit is puckled.
-tota	CAPSELLA, Manch.; Gen, Pl , I., 86,
443	Capsella Bursa-pastoris, Manch.; Fl. Br. Ind., I, 159; CRUCIFERE. SHEPHERD'S PURSE; PICKPOCKET, Eng.; BOURSE DE PASTURE, Fr; HIRTENASCHE, Germ.
MEDICINE.	Habitat.—A weed in the vicinity of cultivation throughout the temperate regions of India; particularly abundant on the N. W. Humáleya.  Medicine.—"This very common weed is bitter and pungent, yields a volatile oil on distillation, identical with oil of mustard, and has been used  ——hamorrhages, as well as
011. 445 7008. 446	7). e ignorant of the uses of e ignorant of the uses of ects at least, alludes to it. Balfour says it "grows in Europe, Persia, Asia, and Japan, used by the natives as a pot-herb."
447	CAPSICUM, Linn.; Gen. Pl., II., 892,
	Fig. 1 T at the first and the mile network and the mile a
448	Capsicum annuum, Linn.; DC Prodr, XIII, Pl.1.,412; Solanacez.  Red Pepper.  Vern.—Mallisa, wangré, lál mirch, marcha, mirch, gdchmirch, Hind
	BURN.  References.—Rand, Fl. Ind., Ed. C. B. C., 193; Stewart, Pb. Pl., 156;  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Vogt, Hort. Sub. Cal., 510; Pharm. Ind.,  DC. Orig. of Cult. Pl., 289; Pha

Capsicum or Red Pepper,

CAPSICIIM annuum.

Habitat -A native of equinoctial America, most probably of Brazil Commonly cultivated for its fruit throughout the plains of India, and on the lower hills such as in Kashmir, and in the Chenab valley up to alti tude 6,500 feet When grown on the hills it is said to be very pungent There are seven varieties, differing chiefly in the length, shape, and colour of the fruit, some being round, others oblong, obtuse, pointed or bifid, smooth or rugose, and red, white yellow, or variegated It is probable that most Indian authors have confused this species with C munimum, which see

449

History -" This species has a number of different names in European languages, which all indicate a foreign origin, and the resemblance of the taste to that of pepper In French it is often called posvre de Guinée (Guinea pepper), but also poivre du Brésil, d'Inde (Indian, Brazilian pepper), &c, denominations to which no importance can be attributed Its cultivation was introduced into Europe in the sixteenth century. It was one of the peppers that Piso and Maxgraf saw grown in Brazil under the name quija or quiya They say nothing as to its origin" (DC Orig of Cult Pl) "Chillies are not mentioned by any Sanskrit writer, con-sequently their introduction into India must have taken place at a comparatively recent date It is probable that the Portuguese brought the fruit from the West Indies Up to the present time the cultivation of the plant is carried on more extensively at Goa than at any other place on the nestern coast and capsicums are well known in Bombry by the name of Go.ca: mirchi (Goa pepper)" (Dr Dymock, Mat Med W Ind.) Hove alludes to Capsicum as grown in Bombay in 1787 and expresses no astonishment at its existence in India

CULTIVATION OF CAPSICUMS -" A light well manured soil is the best for all kinds in which the plants should be picked out at about four inches rut out

450

giving

(The

Gardener)

Medicine -Dr Stewart says that the fruit is used externally in the form of plasters and taken internally in cholera, it is eaten from a con viction that it counteracts the effects of bad climates

MEDICINE 45I

As a drug, red pepper is considered by the natives as stomachic and stimulant, and is used externally as a rubefacient (Dymock) "It has been employed with success as a topical application to elongated uvula and relaxation of the pendulous veil of the palate Made into a lozenge with sugar and tragacanth, it is a favourite remedy for hoarseness with professional singers and public speakers. In putrid sore throat whether symptomatic or strictly local gargles of an infusion of red pepper are often very usefully resorted to ' (O Shaughnessy Beng Dispens , 468) "It is employed in medicine in combination with cinchona in intermittent and

Lozenge. 452

success in the advanced stages of rheumatism. In native practice it is iolera By in conor-

stimulant in snake-hite Chemical Composition -"Bucholz, in 1816, and about the same time

CHEMISTRY.

Braconnot, traced the acridity of capsicum to a substance called capsicin

### CAPSICUM annuum.

### Capsicum or Red Pepper.

CHEMISTRY.

It is obtained by treating the alcoholic extract of ether, and is a thick ble in water. When gently heated temperature is dissipated in fumes spiration. It is evidently a mixed

substance consisting of resinous and fatty matters.

"Felletar, in 1869, exhausted capsicum fruits with dilute sulphuric acid and distilled the decoction with potash. The distillate, which was strongly alkaline and smelt like conine, was saturated with sulphuric acid, evaporated to dryness and exhausted with absolute alcohol. The solution, after evaporation of the alcohol, was treated with potash, and

and in the seeds, but in so small a proportion that we were unsuccessful in examination so the best solvent for

its hydrochlorate, the aqueous solution of which was precipitated by most of the usual tests, but not by tannic acid.

"The colouring matter of capsicum fruits is sparingly soluble in all intensely red soft it turns first blue,

colouring substances By alcohol chiefly palmatic acid is extracted from

· · ·

plainty should him maitte, as wen as me distinguished water, were neutral to intrus-paper and the water tasteless. We separated the latter and exposed the remaining greasy mass to a temperature of about 50°C, when it for the most part melted. The clear lound on cooling soldified and now consisted of unfeed crystals, which we further purified by recrystallization from alcohol. Thus about two centiformies were obtained of a neutral white stearoptene having a decided aromatic, not very persistent taste, and by no means acred, but rather like that of essential oil of pastley. The crystals melted at 35°C. On keeping them for some days at the

be volutilized, and the part remaining behind acquired a brownish hue. This, no doubt, points out another impurity, as we ascertained by the following experiment. With boiling solution of potab, the stearoptene produces a kind of soap which on cooling yields a transparent jelly. If this is dissolved and diluted, it becomes turbid by addition of an acid. This probably depends upon the presence of a little firity matter, a suggestion which is confirmed by the somewhat offensive smell given off by our stearoptene lift its heated in a glass tube.

stearoptene if it is heated in a glass tube.

"Bucilifin's 'Carsicol' is in our

"Thresh (1876-77) succeeded in i
active principle, the Cappacin, from th

exhausting Cayenne pepper with petrol caustic lye removes capiticin, which is to be precipitated in minute crystals by passing carbonic acid through the alkaline solution. They may

Cavenne Penner or Chillies

CAPSICUM frutescens

be purified by recrystallizing them from either alcohol, ether, benzine, CHEMISTRY. clacial acetic acid, or hot bisulphide of carbon, in petroleum capsaicin

is but very springly soluble, yet dissolves abundantly on addition of fitty oil. The litter being present in the pericarp is the cause why captain can be extracted by the above process "The crystals of capsaicin are colourless and answer to the formula

C.H.O., they melt at 59°C, and begin to volatilize at 115°C. but decomposition can only be avoided by great care The vapours of capsaicen are of the most dreadful acridity, and even the ordinary manipulation of that substance requires much precaution Cabsucin is not a glucoside it is a powerful rubifacient, and taken internally produces very violent burning in the stomach" (Pharmacograph ia)

Special Opinions - f"Stimulant and rubefacient, useful in dyspep-

sin, recommended in infusion as an external application to the eye" Mal 10 - Clalara thur) 'Chiefly used as a con

" (Assistant Surgeon Anund malarious to a certain extent" I. Bombay, Karachi) "Carmiwith opium and fried asafætida gargle it is useful in stomatitis what is called masala in the

Bombay, Bhuy, Cutch) "The capsule is innocuous, the seeds, as well known, are powerfully irritant" (R T H, Morar) "Chilkes are applied by natives to dog-bites An infusion made with 4 drams of chillies and a bottle of boiling water has been found useful in severe sore-throat" (Assistant Surgeon Bhagwan Dass, Rawal Pinds), "In delirium tremens in 20 grain doses" (Surgeon-Major George Cumberl and Ross, Delhi) "Is used in liniments as a rubefacient, in cholera pills with camphor and asafœtida, as an application to elongrited uvula and relaxed throat it is very useful" (A Surgeon) "Active principle, an acrid oil-capsaicin In dyspepsia, a good pill is made with equal parts of capsicum, rhubarb, and ginger" (C M Russell, Civil Surgeon, Sirun, Bengal) "Internally it has a stimulant action on the bowels and helps to relieve constipation " (Surgeon-Major A S G Jayakar, Muskat)
Food -The Irun when green is used for pickling and when ripe is

mixed with tomatos, &c , to make sauces It is also dried and ground for

use like Cayenne pepper (Treasury of Botany)

FOOD 454

or daily curries . ginger, oor can rives the maund

Capsicum, fastigiatum, Blume See C minimum, Roxb

C frutescens, Linn , Fl Br Ind , IV , 239

SPUR PEPPER, CAYENNE PEPPER, GOAT PEPPER, AND CHILLIES THE SHRUBBY CAPSICUM

Vc-

455

CAPSICUM frutescens.

### Cayenne Pepper or Chillies.

la lamera china, Mat , Ilenaikind keyi, KAN ; marlchi phalam, brihu oe bean maricha, f Sann ; Filfile-ahmar, ARAB ; Felfil i seekh, Pres , Gas miris, Sivo

1782, Los miris, NNO.

References—Kath, H. Ini. Fi CBC, 103, Astehnon, Cat, Ph. Pl., 103, DC. Origin of Cull II, 20, Veret, Hort Sub Cal, 510, U.S. Divers, 18th Id, 413, U.C. Dni'r Mat. Vel., Hind, 213 Anstir, Hal Ind, 1, 30 G. Shaughness, Heng Divent, 48, Buden Povell, Hal Ind, I, 30 G. Shaughness, Heng Divent, 48, Buden Povell, H. Prod., 331, Kovle, H. Hinm. Bt. I, 150, Altistop, I, Hind. Dist, 205, 100, Balfur, Cycles, Treasury of Rotany, Smith, Die, 91, Summonds, 1709, Agril, 200

Habitat .- An annu been recently, compara According to the best

posed to have nith America. of Capsicum, Indian culti-

now cultivated in Ind vated species this is perhaps the commonest, as it is also the largest, being It is grown during the the country, and especi-

t, when ripe, is generally id out on mats to dry in

the sun

Opinions differ slightly as to the plants which afford Cayenne pepper Speaking of this species, DeCandolle says "The great part of the so-called Cayenne pepper is made from it, but this name is given also to the product of other peppers Roxburgh, the author who is most attentive to the origin of Indian plants, does not corsider it to be wild in India" (Orig Cult Pl ) Simmonds writes that "the Cayenne pepper of commerce is obtained chiefly from the pulversed chilles or fruit pods of one or two species of Capsicum (C. samuum, Linn., and C sastigiatum, Blume) So also in the Kew Official Guide (p 100) the dried and pulversed rind of the pods of C. samuum and its allies is said

MEDICINE. 458

Cavenne

Pepper 456

Chilles

457

to make the best Cavenne pepper. Medicine - Chillies are used as medicine in typhus and intermittent fevers and in dropsy, they are regarded as stomachic and rubefacient. In native practice they are prescribed in gout, dyspensia, cholera, and ague

(Atkinson) Special Opinions -6" When taken in curry in unusual quantities, chillies cause, in many instances, great irritation and burning in the rectum, especially after defocation, attended also with scalding and frequent desire

mustard, they form a powerful rubefa-Shib Chunder Bhattacharii, Chanda,

ten grains of finely powdered capsicum

Seed. 450 Cholera mixture 460

seed, given with an ounce of times shows wonderful effects Gray, Lahore) "Stimulant, a

and powder largely in the preparation of choicea mixture and pins, 4 so in gargles for sore-throat' (Brigade Surgeon S M Shircore, Murshedabad; "A powerful stimulant used as a gargle in sore throat, also in ir Thornton Mongher)

ised, although not te, are everywhere

in native curry

by pouring hot vinegar I hey are ' much used for navouring pickles upon the fruits all the essential qualities are procured, which cannot be effected by drying them, owing to their oleaginous properties, hence chilli-vinegar is in repute as a flavouring substance. In Bengal the natives make an extract from the chillies which is about the consistence and colour of treacle A form of soluble Cayenne was sent from British Gui-

Chilli Vinegar, 461 CPIIII Extract 462 Powder 463

#### Bell Pepper; Bird's-eye Chilli.

CAPSICUM minimum.

ana in 1867 in the collection forwarded to the Paris Exhibition" (Sim-

monds, Trop Agr1., 480).

The pods are dried on a hot plate or in a slow oven and then pounded in a mortar. This powder is then passed through a handmill until it is brought to the finest possible state; thereafter it is well sifted and preserved in corked glass bottles for use (Treasury of Belany).

Capsicum grossum, Willd.; Fl. Br. Ind., IV., 239.

461

BELL PEPPER. Vern -Kafri murich, Beno, Hind.

References — Roxb, Fl Ind, Ed C B C, 193; Flück & Hanb, Pharmatog, 452, Dymock, Mat Med W Ind, 2nd Ed 640, Birdwood, Bomb Prods, 222, DC Orig Cull. Pl, 290, Balfour, Cyclog; Smith, Die, 91; Simmonds, Trop Agri. 479

F00D.

Habitat.—Not much cultivated in India, native place uncertain. Food.—Cultivated to a limited extent in gardens, but chiefly for Furopeans, who either cut this capsicum in stews or have it opened, stuffed with certain spices, and pickled in vinegar. The thick fleshy skin is not so hot as that of the other species

465

C, minimum, Roxb.; Fl. Br. Ind , IV., 239; Wight, Ic , 1, 1617.

BIRD S-EYE CHILLI.

Agri , 4790

Syn .- C PASTIGIATUM, Blume; C. BACCATUM, Wall.

Vern.—Gich marich, III.O; Dhan-lung ko murich, lankl-morith, Bill morith, Ber , Lel murith marich, Guij. Mirch, Iel mirch, Dix., Usi-mulaghai, T.M.; Sudmirapa kaia, TEL., Chalir, leda-thina , Mal. ; Asphai medaha, Mal.arak, Field; surth, Pers, Field; -dahma, (inch-pepper), Aran , Mirsi, Sino , Nayu-si, gna yoke, gna yoke-no-pnyan, moyb, Buru.

ppryan, nayon, nayon, na H Ind., Ed C B C, 193, Vongt., Hort Sub Cd., Reference, and H Ind., Eb C B C, 193, Vongt., Hort Sub Cd., Sub-pens., 15th Fd., 320, Bentl & Trem, Wed Pl., 155, U.C. Dutt, Mat Med, H Ind., 211, D, pmock, Mat Med W Ind., 1st Fd. 25tl, Warner, Baser Med., 35, Baden Porell, Pb Pred., 341, Sport, Engcle, 1503, Ballows, Cycle, Smith, Dic., 91, Simmonds, Tree Engcle, 1503, Ballows, Cycle, Smith, Dic., 91, Simmonds, Tree

466

MEDICINE.

stimulant "
or crude inges
fever, it acts

repute in the West Indies. In various forms of cynarche, and in housemessor aphonia, depending upon a relaxed cond tion of the chirtle receiler, it his been found a useful adjunct to gargle. As a rubefacient and counter-intim, the bruised fruit, in the form of politice, acts energetically, added to simp sms. it greatly increases their activity. "Acts as an a.i.d stimulan", and externally, as a rubefacer tused in

Care'es.

CARALLIA integerrima

Small Chillies; Carallia

MEDICINE

putrid sore throat and scarlatina, also in ordinary sore-throat, hoarseness, dyspessa, and yellow fever, and in diarrhea occasionally, also in pites (Baden Powell)

Mixture. 469 "In Scarlatina, the following mixture has attuned much repute in the West Indies Take two table-spoonsful of bruised Capsicum and two teaspoonsful of Salt, beat them into a paste and add half a pint of boiling Water, when cold, strain and add half a pint of Vinegar Dose for an inished for children

same formula forms nies this disease as " (Waring, Bisar

Medicines)

Food —This small "chilli' is rarely used by natives, but by Europeans is steeped in vinegar and mixed with salt, in this form it is employed as a seasoning in stews, chops, &c

# CARAGANA, Lam , Gen Pl , I , 505

47I

FOOD.

470

Caragana pygmæa, DC, Fl Br Ind., II, 116, Royle, Ill, 134, fig 2, LEGUMINOSÆ

Vern -Tama dama, tráma, Ladak , Shmalak Sind

References —Brandis For Fl. 131, Stewart, Ph. Pl., 61, Balfour, Cyclop.

Habitat —A low shrub very much resembling furze It inhabits the dry highlands of the Western Himalaya, altitude 8,000 to 17,000 feet

Fodder—It is browsed by goats and is much valued for fuel in the treeless regions where it is met with Balfour stress that in China the roots of Caragana flava are eaten in times of scarcity

CARALLIA, Roxb , Gen Pl , I , 680

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FOOD

Roots. 472 FODDER

Carallia integerrima, DC, Ii Br Ind, II, 439, Wight, Io, 1
605, Beddome, Fl Sylv, t CXCIII, Ruizophorez.

Syn -C Lucipa, Roxb, Fl Ind Ed C B C, 396 Kurs 1, 451

Vetn - Lierpa Beng, Jar, Lol., Palamkat Nepal Lugitekra Ass, Panischi Bosta Pansi phansi Mur, Karalli, Tel. Andipunar, phansi, Lan Damaia davette, Sing, Bya, Arracan, Maneioga, mani-amya, Burn

References — Brands For Fl, 219 Gamble Man Timb 177 XX Thwater En Ceylon Pl, 120, Dals & Glbs Bomb Fl 96; Voret, Hort Sub Cal 42, Reyle, Ill Him Bot, I, 210, Lithoo, U Pl, Bomb 73, Balfour Cyclop

TIMBER 475 Structure of the Wood —Sapwood perishable heartwood red very hard, durable, works and polishes well, weight from 42 to 51th per cub c foot. In Calcutti used for how e building. In South Kanara employed for furniture and incubinet mixing and in Burmi for planking, furniture, and receptonders. It is tough and not eastly worked brittle and not durable, but has a pretty wavy appearance and is peculiar in structure [Baldome].

The Monkey's Horn, Carapa

CARAPA moluccensis.

# CARALLUMA, R Br , Gen Pl , II , 782

Fleshy, erect nearly leafless herbs with very thick subterete or angular stems The generic Carallum is said to be derived from a South Indian vernacular name

Caralluma adscendens, Br , Fl Br Ind , IV , 76 , ASCLEPIADEE

476

Vern -Culls mulayan, TAM References - Murray, Pl and Drugs, Sind, 162 Balfour, Cyclop Habitat -Met with in and places in the Dekkan Peninsula

FOOD

Food -This fleshy plant is often eaten by the Natives in the form of pickles, or is made into chutney,

477 478

C. edulis, Benth , Fl Br Ind , IV , 76 Syn -Boucerosia edulis, Edge

Vern — Chung, chunga pipps, pipps, pipa, sitún, sitíu suhi gandhal, PB References — Stewart, Pb Pl, 145 Aitchison, Cat. Pb Pl, 90 Mur-ray, Pl and Drugs, Sind, 162, Baden Powell, Pb Pr, 264, Balfour, Cyclop

> FOOD 479

C. fimbriata, Wall: Fl Br. Ind. IV. 77

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MONKEY'S HORN

Vern - Makar-sing, BOMB References -Dals & Gibs , Bomb Fl , 155 Voigt, Hort Sub Cal , 535 ,

Lisboa, U Pl , Bomb , 165 Habitat. - Met with in arid rocky places of the Dekkan Peninsula, from the Konkan southwards, and also in the Ava district of Burma

Food —In the Bombay Presidency the plant is eaten as a vegetable

FOOD.

Carambola, See Averthoa Carambola, Linn, Geraniace &

48I

# CARAPA, Aubi , Gen Pl , 338

Carapa moluccensis, Lam , Fl Br Ind , I , 567 , Bedd , Fl Silv . 1 136, MELIACEE

482

Syn -C OBOVATA, Bl (Kurs, 1, 226) XYLOCARPUS GRANATUM, Kan Vern -Poshur, pussur, Beng Kandalanga, TAM, Pinlayoung, pinl

Vetn — Peshwi, pussur, surso Aanaaanga, 1AM, Piniayoung, pinl én penglayoang Busu, Kadol Sito, References — Rosb Fl Ind, Ed C B C 310 Gamble, Man Timb 74, Kurz For Fl Burm 226 Thwaites Fn Ceylon Pt 61 Pharm Ind, 50 Moodeen Sheriff Sip Pharm Ind, 250, Cooke, Oils and Oilseeds, 10

Habitat -A moderate-sized evergreen tree of the coasts of Bengal, Malabar, Burma and Cevlon

Gum .- It yields a clear, brown, brittle resin Oil -The seeds yield, on expression, a wh tish semi solid fat remuns fluid only at high temperatures It is used as a hair-oil, and also for burning purposes

GUM

CARBONATE OF LIME

Carbon; Indian Lime.

MEDICINE Bark, 485 TIMBER

486

Medicine -" The bark, in common with other parts of the tree, possesses extreme bitterness, conjoined with astringency, it may probably prove a good astringent tonic. It is much employed by the Malays in cholera. colic, diarrhoa, and other abdominal affections" (Pharm Ind.)

Structure of the Wood -White, turning red on exposure, hard

Weight about 45 to 50lb per cubic foot

Used in Burma for house posts, handles of tools, and wheel spokes Orptain Baker, in May 1820, in Gleanings in Science, spoke of Pussuf or Pussuah as being a jungle wood of a deep purple colour, extremely brittle and hable to warp. He said that native boats made of the best species last about three years, and that the wood, if of good quality, stands brackish water better than sal

Caraway. See Carum Carul, Linn, Unbellifera

487

#### CARBON.

Carbon.

Vern — Köyeloh, Hino, Köyaló, Beng, Tsuing, tsuna Kashmir, Sal-lah, Bhotre, Kölasé, Mar, Káslo, kélso, Guj; Kólsa, Dur, Aani Tam; Boggu, Tel, Kari Mat, Iddallu, Kan Angataha, Sana, Zughol, Pers, Fahim, or Faham Arab; Anguru, Sing, Miswe, midwye, BURM

References — Pharm Ind., 289 Moodeen Sheriff Supp Pharm Ind., 87 U.S. Dispens, 15th Ed., 351, Baden Powell, Ph. Prod., 608.9, Ure, Dict of Arts and Manufactures, 720

MEDICINE. 488

Medicine - Wood charcoal is antiseptic, deodorizing, and disinfectant. It has been employed successfully in dispensia, diarrhoea, disentery, and intermittent fevers. It is also used as a dentifice. Animal charcoal is deodorizing and antiseptic It has been employed as an antidote in poisoning cases and as a poultice to foul swellings and ulcers

Special Opinions -6 "In place of animal charcoal, wood charcoal has been largely used in hospitals as a disinfertant. It purifies water and may be used in filters for that purpose" (Annstant Surgeon Shib Chunder Bhattacharys, Chanda, Central Provinces) "The charcoal of Areca nut is a good tooth-powder" (V Ummegudien, Mettapollium, Madras) "Fine powder, with syrup or treacle, useful in sloughing disentery" (Surgeon-Major C J McKenna, Camppore) "Animal charcoal is a blood purifier, and as such is of great value in boils " (Surgeon-Major A S G Jayakar, Uuskit, Arabia). "Wood chirtcoal mixed with oil is used by carpenters is in external application for wounds" (Assistant Surgeon Bhagwan Dass, Cvoil Haspital, Rawal Pindi, Panjab) "Used to stop bleeding from wounds" (Honorary Surgeon P Linsley, Chicicole, Gangam District, Madras Presedency)

For further information see Charcoal

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### CARBONATE OF LIME

Carbonate of Lime.

CARBONATE OF LIME, MARBLE, LIMESTONE, CHALL, and LIME

Vern - Line - Chund chángh, chunnah flind Chun, chund, fleng; Chángh, shat, (qu chi me) balas (lahcel) Pa ; Chang Guj ; Chángh hili chuna Man Changh zhunnah, Dun; Chandambu, shaundandu, Tan ; Bannam, sanna, Tan., Capar, nyra, Malyali ; Sannah, han,

Indian Lime.

CARBONATE OF LIME.

Eudhi, chérna, sankha-bhasm, kapardaka-bhasma, sukil bhasma, sambuka-bhasma, NNN 1 Kils, ahi, ARNN ; Nirah, dhak, PERS ; Hunné, hunu, SING ; Thón-phinu, BURN ; Kopor, Malan.

The Chark.—Khari-mill, Hind, Pn; Khari mill, Beng.; Viligatichina, Mar.; Chek, cileti-thind, Gu; j lidigati-chinind, Dux.; Shimaa, shanndhu, Tan; Shim; isunum, Tru.; Shimarea, Maray; Shima-sunud, Kan.; Kalauhunu, Sing; Micphias of mediyu, thomtive, Br.Ru.

UNSLAKED LIME -Kali kischine, HIND; Kar-shunnambu, TAM; Relia sunnamu, Tet...

References -Page, Hand-book of Geology, &c.; Dana, Manual of

The Minerals of India having been treated in considerable detail in Mr. Ball 8" (Economic Geology" and in the other voluminous publications of the Geological Survey, it is not intended to do more in this work than to indicate briefly the minerals of commercial value. Limestone, Lime, and Marble are, however, of such importance as to justify an account being given, the more so since the literature of these substances is scattered and not readily obtainable. Lime is also intimately associated with many industries, and plays a distinct part in the manufactures which fall fairly within the scope of the present work. It has therefore been thought desirable to give a brief abstract of the available information regarding Lime, Limestone, and Marble. See MARBLE

Marbie.

producing the colouring and veining, and from the presence of imbedded shells, corals, or other organisms (See Marble).

Limestone.

Chalk.

addition of ammonia water.

CARBONATE OF LIME.

Carbon; Indian Lime.

MFDICINE. Bark, 485 Madisha (1979 stor) in unuman ist optionization consists and consists of the c

timber. 486 Structure of the Wood.-White, turning red on exposure, hard. Weight about 45 to 50lb per cubic foot

Used in Burma for house posts, handles of tools, and wheel-spokes. Oaptain Baker, in May 1829, in Gleanings in Science, spoke of Pussuf or Pussuah as being a jungle wood of a deep purple colour, extremely brittle and hable to warp. He said that native boats made of the best species last about three years, and that the wood, if of good quality, stands bracksh water better than stil.

Caraway. See Carum Carul, Linn.; Unbellifere.

487

#### CARBON.

### Carbon.

Vern, ... Köyelah, Hind ; Köyald, Beno.; Tshing, Isuna, Kashinin; Sallah, Bhote; Kölasi, Man ; Köclo, Kölso, Guj ; höisd, Dun ; Kan, Tam ; Boggin, Tri; Kari, Man ; Iddallin, Kan , Angiarhah, Sins ; Zughal, Pers ; Fahm, or Faham, Arab ; Anguru, Sino ; Miswe, miduye, Bum

Reference 87 U S Duct. of Ind , Ure,

MEDICINE.

Medicine.—Wood charcoal is antiseptic, deodorizing, and disinfectant. It has been employed successfully in dispepsia, diarrhea, disentery, and intermittent fevers. It is also used as a dentifice. Animal charcoal is deo

ing been largel

be used in

Bhattachar

It purities water and may nt Surgeon Shib Chunder The charcoal of Areca nut

is a good tooth-powder (r. Ummeguusen, Mettapollium, Madros), "Fine ponder, with syrup or treacle, useful in sloughing disentery" (Surgeon-Major C J. McKenna, Gawapore). "Animal charcoll is a blood-purifier, and as such is of great value in boils" (Surgeon-Major A S. G. Jayakar, Muskit, Arabia) "Wood churcal mixed with oil is used by carpenters as an external application for wounds" (Assistant Surgeon Bagran Dass, Civil Hospital, Raucal Pinds, Panigh). "Used to stop bleeding from wounds" (Honorary Surgeon P. Kimiley, Chicacole, Ganiam District, Madras Presidency)

For further information see Charcoal.

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### CARBONATE OF LIME.

### Carbonate of Lime.

CARBONATE OF LIME, MARBLE, LIMESTONE, CHALK, and LIME.

Veta -- Line -- Chuna, chunah, chunnah, Hivo ; Chun, chuná, Beng , Chúnáh, áhak, (quicklune) kalai (taked) Pa ; Cháno, Guj , Chánok, kali chána. Max , Chunak, chunnah, Duk , Chunámbú, shannámbu, Tam , Sunnam, sunna, Tel., Capar, nýra, Malyal, Sunna, Kan.; Indian Lime,

CARBONATE OF LIME

Sudhá, chúrna, sankha bhasm, kapardaka bhasma, suktí-bhasma, sam buko-bhasma, Sans , Aiis, ahu, Aras , Nurah, ahak, Pers , Hünnu, hunu, Sita , Thou-phiya, Burs , Lapor, Malax.

 $P_B$ 

CHAIK —Khari-mutt, HIND, PB, khari mati, BEND; Vilsyatichuna, Mar, Chak, culati-chuné, Guj, Vilsyati-chunna, DUK, Shimaa, shannambu, Tam, Shima sunnum, TEL, Shimanura, Malay, Shima-sunné, Kan, Ratauhunu, Siag, Mie phéau or me-biyu, Ghombiyu, Burm.

Unslaked Lime -Kali ká chuna, Hind, Kar shunnambu, Tam, Ralla sunnamu, Tel

References - Page, Hand-book of Geology, &c.; Dana, Manual of Nama a 188 a see as \$110a Ph. of

The Minerals of India having been treated in considerable detail in

Mr. Ball's "Economic Geology" and in the other voluminous publications of the Geological Survey, it is not intended to do more in this work than in indicate briefly the minerals of commercial value. Limestone, Lime, and Marble are, however, of such importance as to justify an account being given, the more so since the literature of these substances is scattered and not readily obtainable. Lime is also intimately associated with many industries, and plays a distinct part in the manufactures which fall fairly within the scope of the present work. It has therefore been thought desirable to give a brief abstract of the available information regarding Lime, Limestone, and Marble. See Marble.

Marbie.

producing the colouring and veining, and from the presence of imbedded shells, corals, or other organisms (See Marble).

If The quality or richness of a Liveston r is generally perceptible to the eye, but when this is not the case, it may be detected by the violence of the effer escence produced on the application of a little sulphung or murritic acid, or by heating a fragment before the blow-pipe so as to convert it into quicklime.

Limestone.

Chalk.

### CARBONATE OF LIME.

#### Indian Lime

Lime.

LIMESTONE. 400 It is known as quicklime before being sliked with where, the expression "quicklime" is in allusion to its corrosive property. It is literally Caleic Oxide (CAO) or Carrovarr or Linke deprived of its curbonic acid. On being sliked it is converted into Caccie thypara (Cally O₂) which on being mixed with stand forms mortar or cement. "As an earth, lime is properly disseminated in nature, as a rock, it enters largely into the composition of the earth's crust, it is less or more diffused in all its waters, it forms the principal ingredient (cirtly of bone) in the skeletons of the larger numble, and is secreted by many classes of the invertebrate to form their shells, crusts, shelds, cords, and other means of protection. Economically it is also of vist importance, being used in the manufacture of mortars and cements, in tanning, bleaching, deodorising, and the like, and also in agriculture as a fertiliser or promoter of vegetable decays" (Page)

## FORMS OF LIME USED IN INDIA

There are three kinds of lime used in India: (a) time prepared from timestone, (b) time found on the surface of the ground and known as kankar, and (c) time prepared from fresh-water or marine shells.

## (a) LIME PRON LIMESTONE

Speaking of the distribution of limestone and mirble, Mr Ball in his "Economic Geology says" Limestones can havilly be said to be absent from any of the formations in India, though in some they are either rare or so impure as hardly to deserve the title. In the metamophic series, bands of crystalline limestones occur locally in some abundance, but they are capriciously distributed, being often absent over large areas. In some of the groups of the next succeeding or irrinsition sense, namely, in the Kadapash, Bijawar, and Arvali, the limestones attun's considerable development, and some of the varieties have yielded the marbles which have played such an important part in Indian architecture. In the lower Vindiyans erres the limestones are more notable for their abundance, and the wide areas over which they spread, than for producing any marbles of particular beauty. In the upper Vindiyans, limestones are principally found in the Bhanter group, where they sometimes attun as great a thickness as 260 feet, and are used both as a building stone and for lime.

"In the Gondwana series, limestones are rarely met with, and then chiefly in the Talchir and Raniganj groups, where they occur as lenticular

or concretionary masses

"In the rocks of cretaceous age, within the peninsula, limestones of both sedimentary and coral ref origin occur. The other sources of lime are principally sub recent and recent tufaceous deposits of kankar, traver-

"In the extra peninsular regions the principal formations containing

Immestones are of carbonierous, jurrassic cretaceous, and nummulitic ages. Another source of lone is recent coral. On the whole it may be said that although limers a deur commodity a most of the centres of consumption owing to the cost of carriage, possible sources of time occur in the greatest variety throughout the country, while on the other hand, some of the marbles are probably unsurpassed for beauty by any to be obtained in any other part of the world.

Mr Ball further gives in the succeeding 16 pages of his work, a detinied account of the limestones and marbles, arranged according to prov-

inces The following abstract may be found useful -

In Madras, good limestones and marbles occur at Tachinopoly, Combatore, Kadapah, karnul, and Guntur. These, since the opening

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# Indian Lime.

# CARBONATE OF LIME.

the state of the s	LIMESTONE
	492
supplies and Loh peculiar interest because of their proximity to iron ore.	1
In the Central Provinces, limestones occur at Sambalpur, Raipur and Jabalpur, the latter consisting of the famous marble rocks of tha	tl
name. Limestones also occur throughout the Vindhya range, the mos accessible being in the neighbourhood of Warora. At Raipur a ston-	t d
	494
	495
well as in Northern Afghanist in In the latter the Safed Sang takes its name from a beautiful Statuary marble	1 .
In the Panjáb, marbles and limestones in considerable variety and from different geological formations are met with	
In the North-IPest Provinces and along the Tarái to Darjiling, lime- stones are not infrequent. An account of these may be found in Atkin-	- 497
son's Economic "r. Maller	
on the Geology Spenk	
ing of the lime s Hima-	
layan Districts, Tal. at	:
Jouli in the Kharáhi range, half way between Bageswar and Almora, at	: ]
Chitely, north of Dwarahat, at Simalkha, Bartalohat, and Dhikuli for	- I
Rânikhet, and on the new cart road to Ramnagar. Lime is also made in Borarau. Sor. Sira. Dhyânirao, and Charal Two kinds of limestone	:(
are used in the Treef of me to he are then and from the or own or no	. 1
the foot c	
the other	
this latter	· _
stone costs at the quarries R5 to R8 per 100 maunds, the tax levied	.
by the Forest Department is R8 on that amount, and cartage may be	· (
averaged at half a rupee per mile for a 100 maunds. Thus the stone is	: ]
landed at most points in the district for R30 per 100 maunds, and includ-	·
ing the expense of burning, a maund of lime costs 10 to 12 annas	1
This lime will bear two or three portions of pounded brick or súrkí	1
Second-class lime ready for use now costs R25, and delivered in Naini Tal R50 to R100 per 100 maunds, it will, however, only bear a propor-	1
tion of one part of pounded brick to two parts of lime."	
In Central India, at Gwalior an abundant supply of flaggy lime- stones occurs.	498
In Raiputana, the Arvali group of transition rocks includes many	499
varieties of marble, some of them being of great beauty. The Jhirri quar- ries of Alwar afford hard white marble. Black marble is met with at	
Mandlo, near Ramghur, white as well as pink and grey marbles at Raialo	.1
in Taipur But the most extensive marble quarries of Raiputana are at	1
Makrana in Jodhpur This marble has been celebrated for ages, the Taj	1
of Agra being built of it.	1
In Bombay, there are numerous localities where limestone occurs, but no	500
marble In the Panch Mehals, good building limestones are obtained, but	:)
not hydraulic, and in Guzerat more or less calcareous rocks are met with.	1
L C. 500	•

# CARBONATE OF LIME

C. 508

## Indian Lime

LIMESTONE (	In Assam, in the Brahmaputra Valley, nummultic limestones occur at several localities, the southern face of the Khasia and Jaintya Hills affording an inexhaustible source of supply, known in trade as Sylhet lime
502	In Burma, nummulate limestones occur in Arracan and Pegu, and in Tenasserim true carboniferous limestones are met with In Upper Burma a beautiful white semi-transparent marble, extensively used for carving figures of Gondama, is said to be obtained from the hills in the Madeya district.
503	In the Andaman Islands, an important supply of lime, for Calcutta, is afforded by the coral reefs The writer has been favoured, by Mr. H. B. Medlicott, with the following brief account of the important Lime is a scarce article in many paused in Calcutta is carried many hun. The want of a pure limestone flux at moderate cost has been the chief difficulty in working the iron furnates in the Ranganj coal-field. The most general source of building lime in India is kanker or kunkur (meaning gravel), a granular or nodular stone found on the surface and in the sub-soil. It is purely of secondary origin being formed on the taining in solution more process of soil formation. The production of it is 'y of soaking moisture and course be impure a of foreign matter.
	sh he rules high I flo
504	excellent quality, nd forms a large
\$05	proportion of the lime used in that city  "and, Sylhet—Along the southern foot of the Sylhet hills there is an  te limestones of the nummuliuc series,  of the demand of Calcutta and lower  extent,
506	Vindhyan limestone near Rhotasgarh is ported down the Son in boats, it was Son Canal
507	John Cantain
_ {	time
508	Port Blair which may prove of economic importance, as it is at about the same distance from Calcutta as Katin, and the lime is of equally good quality.  "Other localities where limestone is known are numerous, but at present of merely local importance, or in most Cases of no vidue whitever. A full list of them, as far as they are known, will be found in the Hanual of the Geology of India, Vol. III., p. 449, et seq."

KANKAR.

500

Indian Lime (b) KANKAR OR CONCRETIONARY LIME. CARRONATE OF LIME

KANKAR (KUNKUR),-"Throughout the plains of Upper India the principal source of lime is the kankar which is found in nodules and layers of various sizes in the clays of the Gangetic alluvium. It yields an excellent but somewhat hydraulic lime" (H B. Medlicott. See also

the remarks under Limestone.) "By Anglo-Indians the term 'kankar' (which really means any kind of gravel) has been specially used for concretionary carbonate of lime, usually occurring in nodules, in the alluvial deposits of the country, and especially in the older of these formations The commonest form consists of small nodules of irregular shape, from half an inch to 3 or 4 inches in

diameter, and composed within of tolerably compact carbonate of lime, and externally of a mixture of carbonate of time and clay. The more massive forms are a variety of calcareous tufa, which sometimes forms thick beds in the alluvium, and frequently fills cracks in the alluvial deposits

or in older rocks

"In the beds of streams immense masses of calcareous tufa are often found, forming the matrix of a conglomerate, of which the pebbles are derived from the rocks brought down by the stream. There can be no

As a flux for iron, kankar has been tried on several occasions, and

something less

"Block kankar has been largely employed as a building-stone, more particularly in connection with the Ganges Canal Works" (Ball) Most of the roads in Northern India, and indeed in India generally, are metalled with kank ir.

#### (c) SHPLL-LIME

SHPLLS .- Ainslie, in his Materia Indica, mentions lime produced by SHELL-LIME. nor the ear, challe collect in Tam ! } 11 ..... .!

SII

510

sidered more valuable for building purposes than that obtained from limestone, and fetches a higher price" (T N Mukharji, Amsterd Cat ) was employed

> I to the Agraiengal Medical coast of China

C. 511

L 2

CARBONATE OF LIME.

Indian Lime.

SHELL-LIME.

that I have visited by burning the shells of the genus OSTRFA, whi abr

ab globosa.

LIME ESSENTIAL TO VEGETATION.

AGRICUL-TURAL USES. 512 Lime is invariably present in the ash of all agricultural plants. It however, difficult to decide from this fact alone, whether it is indispesable to vegetable life, since the substances found in ash are universal distributed over the earth's surface and are invariably present in all soil Several experiments have been made by scentific men under various or cumstances to establish fully the above facts, with results to a certal extent satisfactory. For further information on this subject the reader referred to Johnson's How Crops Grow, pp. 166-172.

# INDUSTRIAL PURPOSES.

INDUSTRIAL USES.

Dye - Lime is universally used by the Manipuris to assist in the

Dye adjunct 513 ployed in the Rajshahye district for dyeing thread dark blue; of the Dr. McCann gives the following account: "The thread is first washe with sajji mati and dried."

of patta sajji mati, 4 chitta of cold water, are mixed it

the whole is then pu 3. chttlacks lime and

chettacks of aoosh wood are again added to this solution. The thread is then twice dipped in this so

Callco printing. 514 of permanent colour. A mixture of 4th of shell-lime, 10th of stone-lime and 15th of impure carbonate of soda (roh), with 3 gallons of water, is strained through grass; to this is added the of sulphurate of arsenic and 1th of indigo; the mixture is then boiled "till it assumes the metallic greenish-blue lustre of the peacock's fail. It is then thickened with babbil gum and is then ready for printing." Sie Edward further remarks: "Lime is used in calico-printing, in combination with gum, as a "resist-paste". It is also employed with

A paint. 515 and convert it into 'indigo-white,'
Carbonate of lime is used as a

Tanning 516 hides for the removal of the hair. In England it is universally used to this purpose. It has at the same time a solvent action on the hide "The

this purpose. It has at the same time a solvent action on the hide "The hardened cells of the epidermis swell up and solten the rete malpight, and the same time a solvent action in the rete malpight, and the solvent of the pidermis swell up and solten the rete malpight, and the pidermis swell up and solten the rete malpight.

#### Indian Lime.

#### CARBONATE OF LIME.

# MEDICINAL USES.

Medicine —According to Dutt, in the Hindú Materia Medica (p. 82) lime is used internally in dyspepsia, enlarged spleen, and other enlargements in the abdomen, and externally as a caustic. A mixture of lime,

MEDICINE. 517

rasa

Ainsile says the Vytians prescribe lime water mixed with gingelly oil and sugar in obstinate cases of gonorrhea. "Mixed with gamboge, queklime is applied externally to painful and gouly limbs It is also used as a caustic in the bites of rabid dogs' (S Arjun, Bomb. Drugs) The exhaustive account of the medicinal properties of lime given by Dr. Waring in his Bazár Medicines (§ 85) may be here quoted, since by doing so it will practically be unnecessary to refer to other authors—

518

" Li of lime

ounces ing wel lime is d

lime is deposited at the bottom. In cases of emergency, as burns, &c., half an hour is sufficient for this purpose, otherwise it should be allowed to stand for twelve hours at least before being used. It is only the clear water which holds a portion of lime in solution, which is employed in medicine. It is advisable always to keep a supply ready prepared, as it is useful in many ways, and it will remain good for a long time, if kept in well-stoppered bottles, so that the air cannot have access to it. The dose for adults is 1 to 3 ounces twice or thrice daily, it is best administered in milk.

510

adap parec and t water. The c

or thrice daily

or three daily
"In actify of the stomach, in heart-burn, and in those forms of indigestion arising from or connected with acidity of the stomach, lime water
in doses of 1½ to 2 ounces, is often speedily and permanently effectual. It is
particularly usefulin indigestion when the urine is scanty and high coloured,
and when vomiting and acid eructations are prominent symptoms. It
is best given in milk.

"In distribution arising from acidity, lime water frequently process useful, it is best given in a solution of gum arabic or other mucilage, and in obstinate cases to drops of laudanum with each dose increase its efficacy, it may also be advantageously combined with Omun water. In theronic dysentery the same treatment sometimes proves useful Enemas of lime-water diluted with an equal part of tepid milk or mucilage have also been used with benefit. It is especially adapted for the diarrhea and vomiting of infants and young children which result from artificial feeding, in these cases a sixth or a fourth part of lime water may be added to each pint of milk. The saccharated solution of lime has also been found of great service in this class of cases

"Obstinate vomiting sometimes yields to a few doses of lime water in milk, when other more powerful remedies have failed It is worthy of a trial in the vomiting attendant on the advanced stages of fever; it has

## Carbonate of Lime.

le lian Live.

MEDICINE.

from thought to arrest even the little some to bye tow force It is also a ern edy of much salaman present en metreidears.

"To vier el'aduteur no santation of te gental cognie (Prune) Pullendel, harding the givets we know the effective water there we have mean they were chimes affected and he effect. Lower they and of the majorital decorations charges have in a me instances been in a pated and even a reel by the use of various injections of a m eture of a part of firm water and a crig of

520

"In profult, here water in there of I wince to milk, there or fine times a day, proves beneficial in a me causa it is thought to be especially adapted for their cases in which attorness and ut ere are continually latining. To be of service, it evaluates to be perse reed in the it we time. Singlet is not offer at easiester ded by much dis narge have been found to improve under the use of hime water as alwalappleation. For syphalater at era or themeres, one of the best applicar see is a enserted of time water I pint and cal met 30 graves this, commonly known as black wash, abould be kept een and, applied to the part by means of a pree of lint or eng mouvened with it. Many frems of skin decess, arended with much secretica and with great orbital on or burning, are benefited by lime water either pure or einjuneil with al. To ever or era bel nichter it proves very servicent's. Druged with an equal part of water or mile, it forms a useful angestion in dis harges from the noise and ears occurring in screfulous and other children

"In Consumption, lime water and milk has been strongly recommended as an ordinary beverage. The same dietelrink has been advised in Disbetes, but little dependen e is to be placed upon it as a cure, it

may produce temporary benefit, "In Threid-vorm, enemas of 3 or 4 ounces of time water, repeated two or three times, have sometimes been found sufficient to effect a cure. "In Possoning by any of the Meneral Acids, hime water given plenti-

fully in milk is an antidote of no mean value, though inferior to some

of the other alkalies. It may also be given in Poisoning by Assenic. "To Burns and Scalds few applications are superior to I me Lini-

ment, composed of equal parts of time water and a bland of Olise of is generally ordered for this purpose, but haseed of answers just as well, and where this is not at hand Sesamum oil forms a perfect substitute When thoroughly shaken together, so as to form a uniform mixture, it should be applied freely mer the whole of the burnt surface, and the parts kept covered with rags constantly wetted with it, for some days if neces This limitent on cotton-wool, applied to the pustules, is said to be

effectual in preventing Pelting in Smill tox."

## LIME AS A CONDIMENT

FOOD In pan.

521

Food -Lime forms one of the essential Ingredients of the preparation known as pan which is universally chenced by the natives of little? Lither the lime prepared from limestone or from shells may be used for this purpose The latter, however, being an animal product, is not used by persons who are strict in their religious observances. It is also mixed with the pulp of the fruit of Bornssus flabelliformis, in preparing the cake called talpatals (see the remarks under B 901) The Pharmicopana of India, alluding to the use of hime in pan, \$35,5 "when used for any lengthened period, it considerably modifies the natural condition of the mucous covering of the mouth, and alters the appearance of the tongue so as to render it useless or fall icious as a means of diagnosis in disease Its use in

moderate quantities does not appear to act prejudicially on the system, but when largely indulged in, it lays the foundation of much visceral disease

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Indian Lime

CARBONATE OF LIME.

## DOMESTIC AND OTHER USES.

Manure —As a manure, lime plays an important part. It is largely employed for this purpose, and is "particularily valuable upon very rich vegetable soils, such as those formed over peat bogs, its effects in these cases are partially due to the decomposition of the organic matter, which it renders soluble and capable of assimilation, while the lime itself is converted into carbonate" (Millers Chemistry, Part II, 469). The black cotton soils are usually rich in most of the elements of plant food except lime. Lime therefore "acts beneficially on the soil itself. Owing to the general absence of lime in these black soils the crops produced on them are not so diversified as is desirable. A dressing from 1,000 to 5 sooils of lime may be applied per acre, according to the price at which the lime can be obtuined "IVE Rebertson, Agriculture, 13.

I ime is often employed as a deodorising agent "It is mixed with decaying vegetable matter, and with animal bodies, with the view of hastening their destruction and preventing the escape of offensive and noxious effluvia. This effect lime produces by its tendency, in common with the other caustic alkalies, to carry the decomposition through the intermediate stages of putrefaction at once to the ultimate products"

(Morton, Cyclop , Agriculture, Vol II , 266)

Soap —Lime is which is described this soap, into whi slaked lime equal t

lime and sand "

whole is to be boiled solution of glycerine are produced, when the latter may be drawn off from the bottom of the pan. A certain quantity of water and commercial carbonate of soda (the latter being slightly in excess of the quantity of lime used) are next added and the boiling and stirring continued, when the hard insoluble lime soap will be decomposed, and a "granulated" carbonate of lime will deposit, leaving a soluble soda soap florting in flakes on the surface of the liquid. If the soda employed does not contain

te

Mortar and Cement -The use of lime in the preparation of mortars and cements is too well known to require any special description following paragraph from Miller's Chemistry, Part 11, 462, is, however, quoted here, as it will be found instructive 'The great consumption of quoted here, as it will be found instructive 'The great consump time in the arts is for the purpose of making mortars and cements lime, when made into a paste with water, forms a somewhat plastic mass which sets into a solid as it dries, but gradually cracks and falls to pieces It does not possess sufficient cohesion to be used alone as a mortar, to remedy this defect and to prevent the shrinking of the mass, the addition of sand is found to be necessary. Ordinary mortar is prepared by mixing one part of lime into a thin paste with water, and adding 3 or 4 parts of sharp sand of tolerable fineness, the materials are then thoroughly incorporated, and passed through a sieve to separate lumps of imperfectly burnt lime, a suitable quantity of water is afterwards worked into it, and it is then applied in a thin layer to the surfaces of the stones and bricks which are to be united. The bricks or stones are moistened with water before applying the mortar, in order that they may not absorb the water from the mortar too rapidly. The completeness of the subsequent hardening of the mortar depends mainly upon the thorough intermixture of the

DOMESTIC. Manure 524

> 50ap, 525

Cement. 526 152

CARBONATE OF POTASH.

Sonters of.

In India covered of our ligaterized to the are employed, a site are funding standarded the sound of the product extend Intimated in the same as section as section as section as section as section as the same as section as secti

527

**Potashes** 

528

Pearl-ash. 520

Conf with A.

789

# Carbonate of Potash.

Potastis, Printesis, Carronate of Potasse, Fr., Kon-

Vernamand 1840; Tindler, installer or orbitale, than i Therete named will be maded the grands have Mary Hard vertar, stand theory, Tang Handsoppe, Hill trooping, Tec., Haram, pargial kiram, managan, Maka i Handla uppe, Kan i Dismontanian, gazalishing, haw

References. - Farm Ind. 151 Matern Shrif, Subj. Parem Ind. 251 Frence on Committee by Rosco and Schelmene, bold II, 517 U.S. Directo, 251, 1515, Dec. Det. of Arts and Manufactures, 472.

bjons' bneyeloga & ses , fistfout a Cycl &

The monorate of the metal Potassum is known commercially as Potash [18,0]; theoret cally the, by count in an with a molecule of curbon double (CO), forms the carbonate of potash (18, CO). The term potash is, however, loopely applied to the oude and to the carbonate the latter being more currectly polather, and when calcined practicals. The carbonate is solutionary to the carbonate in solution of the carbonate in solution.

n solution about a control of the first access with their trap dly thick o thereby a

dry heat it melts at 800°, but hoves a portion of its extbonic acid at still higher temperatures it volatilizes. Acids decompose it with brisk effervescence of Carbonic acid, leaving behind salts of the acid employed with potrssium. A concentrated solution of the salt on cooling welds enjoined of the carbonate in which three proportions of water have combined with two of the salt. At 130° the whole of this water of cristallization may be expelled and the anhydrous carbonic obtained.

Sources.—For many seris the entire source of carbonate of potash was the ashes of plants, land and marine. Although new sources of supply have to a large extent discrete the industry, about one-half

even of the same plant the succulent young parts are more highly charged than mature tissues. Of different plants, pines contain on an average only 0.45 per cent, oaks 0.75 to 175 per cent, are shoots 5.50, ordinary straw 5.8, ferns from 4.25 to 5.26, Indian corn stalks 17.5 nettles 25.03, wheat straw before earing 41.0, wormwood 73.0, and beet about the same amount.

These facts naturally suggest the plants best suited for the precuration

sugar has been extracted from the roots, we have to deal with a solution which contains something besides sugar and water. After it has been

Indian Manufacture of

CARBONATE OF POTASI

clarified and the crystallizable sugar extracted, the remaining liquor is SOURCES OF permitted to ferment, that the uncrystallizable sugar may be turned into alcohol and so utilized; but in the stills there will yet remain a waste

By evaporataporating and

· of a mixture of potassium chloride, sulphate, and carbonate (together 50 or 60 per cent ) with insoluble matter and a good deal of sodium carbonate. The potassium carbonate forms about one-third of the weight of the calcined mass. and arises in a great measure from the destruction, during the calcining

duced here because of its direct bearing on many of the native contrivances employed in India for the preparation of pearlash. It would be almost impossible to over-estimate the extent to which a crude carbonate. of potash is employed by the people of India. In another volume under Alkaline Ashes (A 759, also A 1626) will be found an enumeration of the principal plants used by the natives of India for that purpose, and these should be compared with the plants given under Berilla (B. 163) as employed in the manufacture of carbonate of sods. Although in India immense tracts of mountainous land are injuriously covered with various species of wormwood (see Artemesia), except as a manure, the ashes of these plants are not apparently utilized. From the high percentage of carbonate of potash which the wormwoods contain, the preparation of pearlash might be confidently recommended to the poorer inhabitants of these regions as a useful new industry A large export trade might reasonably be anticipated from the Himálayas to the plains of India, if not to foreign countries.

While this is possible, an equally profitable industry might also be organised in preparing the carbonate from the injurious amount of saltpetre that impregnates the soil of many parts of India. One of the methods recommended for obtaining pure carbonate of soda for the laboratory is to heat pure saltpetre in a porcelain or earthen crucible, adding small pieces of charcoal till deflagration ceases. This is the rationale of a process that might readily be employed in converting crude saltpetre into carbonate of potash As a commercial fact, large quantities of carbonate are now manufactured from the sulphate, indeed after the ashes of plants, this is the next most important source of the carbonate. A curious and recent A curious and recent

source is the Suint or perspiration on the wool of sheep.

Uses of Carbonate of Potash .- It is largely employed in the manufac-

The Carbonate from Saltpetre.

Wormwood

530

53 I Sulphate

532 From Suint. 533

Soft Soap .

Dyeing. 537 Rectification of Spirit

538 Bleaching.

539

inedicine and for other purposes" (Balfour).

Manufacture in India.-Although, as already stated the ashes of plants are universally used, both in dyeing and in medicine, throughout India, every district or almost each artisan holding special merits as possessed by the ashes of this and that plant, still there are no large recognised centres where the carbonate (which alone must be held as the active principle in these ashes) is prepared for transport, still less export. The suggestion made above as to a possible Indian manufacture from worm-

## CARBUNCLE.

#### Carbonate of Soda: Carboncle.

# CARBONATE of POTASH.

wood on the hills and from saltpetre on the plains seems, therefore, worthy of consideration.

Yearly Production .- The world's annual production is about one million handredweights.

MEDICINE. 540

Medicine. - Carbonate of potash is antacid, then alterative and diuretic, and in over-doses poisonous. It is described in Hindú works on medicine

"as stomachic, lavative, diuretic. It is used in urinary diseases, dyspepsia, enlarged spleen, and other enlargements of the abdominal viscera. A decoction of chebulic myrobalan and robitaka bark is given, with the addition of carbonate of potash and long pepper, in enlarged spleen milma In strangury

Special Opinions - § "An impure carbonate of potasu (papara hara) is also sold in the Bombay bazars, and is used in the preparation of pápáda (pápun), or little cakes made with the meal of the different sorts of dhall and a little quantity of asafortida; these are given as a digestive, but more as an article of food than medicine; the cakes are roasted over the fire and taken with rice" (C. T. Peters, M.B., Zandra, South Afghanistan). For further information see ALKALINE EARTHS, BARILLA, POTASH,

REH and SALTPPTRE.

54I

## Carbonate of Soda.

Vern,—Sajji, sajji-mitti, sajji-khor, Hind; Sajji, Beng, Chour-ki-matti, chour-ki-mamak, Duk, Sajjekhora, Mar; Shach-chi-karam, Tan; Lota-sach-chi, Tet., Qili, milhul-giti, Aran; Shikhar, tine-gdaur, Pers, Sarjikakhara, Sans

References .- Pharm. Ind., 322; S. Arjun, Bomb. Drugs, 160, 161; U. S.

MEDICINE. 542

Dispens , 1321 ; Ure, Dict. of Arts and Manufactures, 854. Medicine. - A substance too well known to require any special descrip-(See remarks under the preceding and under BARILLA, SAJJI, and It is antacid and then alterative "A paste made of equal parts of varakshara and saggi-kakshara with water is applied to abscesses for the

purpose of opening them" (U. C. Dutt). Special Opinions - 5" Carbonate of soda (impure), bángada khára, being the residue left during the manufacture of glass bangles A second form, which appears to be a purer carbonate of soda, is called Suráti

khāra; both are used in the treatment of dyspepsia" (C. T. Peters, M.B., Zandra, South Afghanistan).

# CARBUNCLE.

543

545 Bombay.

546 Burma.

547

# Carbuncle.

hande of the ancients is garnet cut, as it is called, en cabia the stones, when of good esteem ithin the

It is be-Jalcutta " Calcutta. 544 South India. in South India, where they are known as Manikiam (lam. & 101.).

The garnet when cut as a Carbuncle is convex above and hollowed

out below, so as to leave but a thin layer of the stone through which the light passes, revealing the bright colour. The finest carbundes are said to come from Pegu and Ceylon. Conf. with Carnelian.

Heart-Pea or Winter Cherry.

CARDIOSPERMUM Halicacabum.

CARCHARIAS, Muller and Henle.; Day, Fishes of India. 710.

548

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FOOD.

550

55 T

Carcharias.—Several species of sharks are employed by the natures of India in the preparation of a medicinal oil. It seems probable that the sharks specially selected for that purpose belong to the genus Carcharias. Of these C. gangeticus is the most ferocious: it ascends the rivers to about the limits of the tidal influence. C. hemiodon also goes up the rivers, specimens having been caught near Calcutta. Several other species are frequent in the Red Sea and Indian Ocean, particularly on the coast of Sind. (See SHARKS AND SHARK FINS )

## CARDAMINE, Linn ; Gen. Pl., I., 70.

Cardamine hirsuta, Linn.; Fl. Br. Ind , I , 138; CRUCIFFRE.

References .- Thwaites, Fn Ceylon Pl., 14, Dals & Gibs., Bomb Fl., 7. Stewart, Pb Pl., 13; Treasury of Botany

Habitat .- A herb found in all the temperate regions of India; vers abundant in Bengal during the cold weather

Food.—The leaves and flowers constitute an agreeable salad, resembling water-cress.

Cardamom, see Amomum subulatum, Roxb.,-the Greater Cardamom: and Elettaria Cardamomum, Majon-the Lesser Cardamom.

Cardamom seed oil, see Amomum subulatum, Roxb.

CARDIOSPERMUM, Linn.: Gen. Pl., I., 202.

Cardiospermum Halicacabum, Linn , Fl. Br. Ind , I., 670 ; Wight, Ic., t. 508, SAPINDACEE.

BALLOON-VINE, HEART PEA OR WINTER CHERRY.

Lataphatkari, nayaphatki, noaphutki, sibjhil, Beng ; Hab-ulkalkal (seed), PB., Karolto, Guj., Kanphett, bulha, shih jal, Bomb; Muda-cottan, TAM., Nalla gulistenda, kinakna biliha-kahara, Tel.; Tyautishmati, karavi, Sins , Habb-ul kalkal, taftaf, Anne ; Hala-mai, Bunn , Painaira-wel, Sino

mat, D-km, rannerser, sino BC, 333, Austie, Mat. Ind., II,
References—Roch, R. Ind., S. S. St. St., Austie, Mat. Ind., II,
Mat. Med. Hind., 150, Burread I, and Iran of St. IV, S. C. Dutt,
Mat. Med. Hind., 150, Burread I, and Iran of St. IV, S. C. Dutt,
Mat. Med. W. Ind., ind. Ed., 157, Luts., I. P. P. M.; S. S. Ayrin,
Bomb Deuge, 14, Haden Pewell P. P., 330, Bifour, (vol.), Treakary of Rolany; Kneede, VIII., 128, Remph, VII, 14, 17, 11 March

Bur., 502, 752

Habitat .- A climbing herbaceous plant plentiful in the plains of India: chiefly in Bengal and the North-West Provinces; is distributed to Ceylon and Malacca. Tendrals are modificat ons of portions of the flower bud;

fruit triquetrous inflated.

Medicine -The Root is used in medicine as an emetic, lavarise, stomachic, and rubefacient. It also possesses d'aphoretic, d'ureta, and tonic properties. In combination with other remedies it is prescribed by Hindu phy sicians in theumatism, nervous d seases, p.lei, Ac. The decicetion of the root is considered aperient by native practitioners, who prestribe it in does of half a tea-expful twice daily. It is mustar rous and slightly nauscous to the tave. The seed is said to be come, all in the Panjáb (Hab-ul-kalkal). Mr. Baden Powell remarks; "it is Lied as a

MEDICINE. Loci, 552

5444 L

C. 553

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## CARBUNCLE.

## Carbonate of Soda: Carbonele

#### CARBONATE of POTASH.

wood on the hills and from saltpetre on the plains seems, therefore, worthy of consideration

MEDICINE 540 Yearly Production.—The world's annual production is about one million hundredweights

Medicine.—Carbonate of potash is antacid, then alterritive and diuretic, and in over-doses poisonous. It is described in Hindu works on medicine "as stomachic, lavative, diuretic. It is used in urinary diverses, dispepsia, enlarged spleen, and other enlargements of the abdominal is err. A decortion of chebule myrobilan and robustaka brik is given, with the addition of carbonate of potash and long pepper, in enlarged spleen and liver, and in temours in the abdomen called guilma. In stringury or painful micturition, carbonate of potash with sugar is considered a very efficacious remedy "(U.C. Dutt. Mat. Med. Hind., 87).

Special Opinions — § "An impure carbonate of potash (papida lhara) is also sold in the Bombry bazárs, and is used in the preparation of pápada (papin), or little ciles made with the meal of the different sorts of dhall and a little quantity of asafectida, these are given as a digestic, but more as an article of food than medicine, the cales are reasted over the fire and taken with nice" (C. T. Peters, M. B., Zandra, South Afghanittan)

For further information see Alkaline Earths, Barilla, Potash, Reh and Salteetre.

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# Carbonate of Soda.

Vett. - Sajis sajji mitti sajji khar, Hind 1 Sajji, Beno 1 Chour kimatti, chour ki namak Dus 1 Sajjikhara Man 1 Shach-chi kuram, Tam 1 Lota sach-chi Fet. 1 Qili, milhul-qili, Anna, Shikhar, tinegasur, Fenn 1 Sarjikalshara hann

gazur, Pers ; Sarjiklishara Sava References — Pharm Ind., 312; S. Arjun, Bomb Drugs, 1'0, 161; U.S. Busjens, 1321; Ute, Dict. of Arts and Manufactures, 854.

hedicine 542 Medicine —A substance too well known to require any special description (See remarks under the preceding and under Barilla, Saii, and Rhi) It is anticid and then alternive. "A paste made of equil parts of yield are and approached with water is applied to absceries for the purpose of opening them." (U.C. Duit)

Zandra, South Afgranistan).

# CARBUNCLE.

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#### Carbunele.

"The Calturch of the accepts is garner out as it is called, an other claim. The arm is at I practiced in Incl., and the so men when elg sold gas yard which are every beau folland would meet with more event write in a the step them to be charp at the has purthern with the cash for large as a site and model with the a partial faith each for large as a site and arms in them for model at a site in the model at a site in them for model at a site in the site of model at a site in the site of the sit

CLAPSTO SEE SES SES SES SES SES

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The investment on an a first or be not true at over all fell well refer we status her the act of have of the a months which the premise method to the first carbon to the first carbon act and a docard account his common highest control of the well Carendan.

	SPERMU acabum.
CARCHARIAS, Muller and Henle.; Day, Fishes of India, 710.  ployed by the natives of t seems probable that the 10 the genus Carchanas Of these C. gangeticus is the most ferocious: it ascends the rivers to about the limits of the tidal influence. C. hemiodo also goes up the rivers, specimens having been caught near Calcutta. Several other species are frequent in the Red Set and Indian Ocean, particularly on the coast of Sind (See Starks AND Stark Fins)	548
CARDAMINE, Linn; Gen. Pl, I., 70	
Cardamine hirsuta, Linn.; Fl Br. Ind, I, 138, CRUCIFERE.  References.—Thwaite, Fn Ceylon Pl. 14, Dals & Globs, Bomb Fl. 7.  Stewart, Fb Fl. 73, Treasury of Botany  Habitat.—A herb found in all the temperate regions of India, very abundant in Bengal during the cold weather	549
Food.—The leaves and flowers constitute an agreeable salad, resembling water-cress	F00D. 550
Cardamom, see Amomum subulatum, Roxb.,—the Greater Cardamom; and Elettaria Cardamomum, Maton—the Lesser Cardamom	
Cardamom seed oil, see Amomum subulatum, Roxb.	
CARDIOSPERMUM, Linn., Gen. Pl., I., 393.	
Cardiospermum Halicacabum, Linn, Fl. Br. Ind., I., 670, Wight, Ic., t. 508, SAPINDACEÆ	551
BALLOON-VINE, HEART PEA OR WINTER CHERRY Vern. Laisphaftar, nayophafish, naophaith, subhul, Beno, Hab-ul- kalkal (seed), Pa, Karolo, Guj, Kanphati, bodha, sha yai, Bonn, Muda-cettan, Tan, Nalla guinsinda, kinakus bdaha kokara, Tel., fyautisimati, karasi, Sans, Habb ul kalkal, tafiqi, Arab, Ma-la- mai, Iurni, Pamaira vel, Simo, References —Rosb, Fi Ind., Ed. C.B.C., 335, Annile, Mat. Ind., II, 244, T.————————————————————————————————————	
MedicineThe Root is used in medicine as an emetic, lavative,	MEDICINE. Root. 552

CAREYA.

	[
MEDICINE. Leaves 554	tonic in fever, and a diaphoretic in rheumatism." The fried LEAVPS are said to bring on the secretion of the menses. The following prescription is given by Dr. Dutt as a Hindle cure for amenorrhea: Equal parts of Fyautishmath leaves, saryibá (impure carbonate of potash), Acorus Calamus root (vachá), and the root-bark of Terminalia tomentosa (asana) reduced to a paste with milk; taken in doses of about a drachm for three days (Mat. Mad. Hindus). "On the Malabar coast the leaves are administered in pulmonic complaints, and mixed with castor oil, are inter-
Fiant. 555	nally employed in rheumatism and lumbago." Mixed with jaggery and boiled in oil, they are a good specific in sore eyes. The whole PLANT, boiled in oil, is sometimes employed to anonit the body in bilious affections. Rheede says that rubbed up with water, it is applied to rheumatism and stiffness of the limbs. The plant, steeped in milk, has
Juice. 556	
rood. Leaves. 557 Seeds. 558	Dutt. Drury. S Arjun   Food.—"In the Molucas the Leaves are cooked as a vegetable" (Drury, U P!) Lisboa states that in the Bombay Presidency the leaves and shoots are "eaten as green" Balfour remarks that "popular superstition asserts that by eating the series, the understanding is enlightened and the memory rendered miraculously retentive"
	CARDUUS, Linn.; Gen Pl, II, 467.
rro	Carduus nutans, Linn., Fl. Br. Ind , III , 361; COMPOSITE.
559	THE THISTLE
,	Vern -Kanchári, tiso, bidaward, PB , Guli bidáwurd, Kashmir
,	References.—Stewart, Pb Pl, 123; Baden Powell, Pb Pr, 356; Dymock, Mat Med W Ind, 386; also 2nd Ed, 466.
,	Habitat — A tall stout thistle, found in the Western Himalaya, from Kashmir to Sinila, at an altitude of 6,000 to 12,000 feet, also at Hazara in the Panjáb, and in Western Tibet, at an altitude of 33,000 feet.
MEDICINE. Flowers. 560	Medicine.—The flowers are considered febrifugal in Lahore; according to Mr. Baden Powell, in Kashmir, they are also used to purify the blood Fodder.—Eaten by camels greedily When brussel, to destroy the
FODDER 561	seasons, when other food is scarce, is I vernacular names with those given
DOMESTIC	Domestic.—Murray remarks that the leaves are employed to curdle milk.
562	CAREYA, Roxb., Gen Pl, I., 721
	Leaves alternate, not gland-dotted Flowers large, 4 merous Blamens numerous, in sweral series slightly connate at the base, filaments fillform, innermostiand outermost without anthers Overy 4 S-celled, crowned by an annular duc. Fruit large, globose, fibrous, disseptments absorbed, sreds numerous
	A genus, containing only 3 species, and these confined to India, named in honour of the Rev. Dr. Carey—one of the distinguished Serampore Missionaries—a distinguished botanist and a contemporary of Dr. Roxburgh's.

C,562

C			
Careya.			

Careya arborea, Roxb., Fl. Br. Ind., II., 511; Bedd., Fl. Sylv., t. 205; Wight Ill., 99, 100; MYRTAGEE.

References -D 1 Fill Fig. D.

Habitat.—A large deciduous tree, with the leaves turning red in the cold season and the new foliage appearing in March and April just after the flowers have faded. Frequent in the Sub-Himsdayan tract from Western, and South

Gum.—Yields a brown or greenish-brown gum, regarding which but list known (Akkinson). This forms with water a tolerably thick mucilage of a dark-brown colour (Dymock).

Dye and Tan.—Bark used for tanning. (Kurs) The Rev. A. Campbell says that in Manbhum the bark is used as a dye.

Fibre.—The bark yields a good fibre for coarse cordage. [Gamble, Campblell, &c) Lisboa remarks that the bark affords a "stuff suitable for brown paper of good quality." Tasar silkworms feed on the leaves (C P. Gas, 1870, 504).

in snake-one and an infusion of the same is given internally (Kev A.)

child-birth. They heal ruptures cau

heal ruptures cau
"The CALICES of

kimbha, they are clove shaped, 4-partite, fleshy, of a greenish-broin recolour, and about an inch long, when placed in water they become coated with muclage and emit a sickly odour. The natives use them as well as the Juick of the fresh bark with honey as a demultent in coughs and colds." (Dymood) "The return is also astringent and generally aromatic, and is used in the form of a decoction to promote digestion." (S. Arjun, Bomb Drugs, 55)

Food.—The tree blossoms during the hot season, the seed ripening about three or four months after (Roxb). The Rev A Campbell says the fruit is eaten by the Santals, and is also used medicinally, as are the flowers. The fruit, known as khinni, is eaten in the Panjab, it is also given to cattle. The seeds are said to be more or less poisonous.

C. 576

563

CAREYA

GUM.

564 TAN. Bark. 565 DYE.

FIBRE. Bark. 567 Paper naking. 568

568 MEDICINE. Bark, 560 Infusion.

570 Flowers. 571 Juice. 572 Fruit.

573 FOOD. Seed. 574 Fruit. 575

- J	( Christian ) vy ant situation
CARICA Papaya,	The Papaya or Papaw.
timber. 577	dult red beauti th from brought
	Mishmi Hills by Dr. Griffith in 1836, were found to be quite sound on being cut up, though they cars implements. Drury for boxes. It takes for boxes. It takes
DOMESTIC. Slow-match, 578	ture, and cabinet-work but is too heavy for such purposes. It stands well under water and is much admired for axles. "It is frequently employed for wooden hoops, being very flexible" (Drinry, U. Pl.). Beddome says it is a favourite wood in some parts of the country for charcoal.  Domestic Uses.—The fibrous bark is used in Mysor as a slow-match to ignite gunpowder (Cameron). In many parts of India it is also used in the preparation of fusees for matchlocks. Brandles says these are prepared.
Tinder 579	TI (Drary, U. Pl.)
580	Careya herbacea, Roxb.; Fl. Br. Ind., II., 510; Wight, Ic., t. 557.  Vera.—Bhui dalim, Beno.; Chuwa, Nepal.; Bhumi darimba, SNNS. References.—Brands, For. Fl., 237; Kurs, For. Fl., 1., 490; Gamble, Man. Timb., 197.
:	Habitat.—A small undershrub with pink flowers which appear from February to March. Common in the Taraf from Kumaon to the Khasia Hills and Chittagong. Also plentiful throughout the plains of Bengal, Oudh, and the Central Provinces.  CARICA, Linn.; Gen. Pl., I., 815.
581	Carica Papaya, L.; Fl. Br. Ind., II., 599; PASSIFLOREE.  THE PAPAN OF PAPAYA TREE.  Vern.—Pappaiya, pepya, papeya, Beng.; Papaya or fobiya amba, pepiya, popaya or pobiyayah, Hi. TOROHU-BURON, Pa; I BOMB; Paputa, katha eranda katha, Gui; (Ma.)
,	MAL, 1 URM.; URM.; URM.; URM.; URM.; SING. 1 URM.; SING. 1 URM.; SING. 1 URM.; SING. O' Gibt. UR. O' UR. O' UR. O' UR. O' URM.; Sp\$, 1730; Moodern 114, Dymock, Mod. Guide to Micsenti, Vill.; Fleming, List

## The Papaya or Papaw.

CARICA Papaya

- Las 4 mel . Mat Ind II 202 O'Shaunh.

Habitat. - A sub-herbaceous, almost branchless tree, commonly cultivated in gardens throughout India: from Delhi to Ceslon. Fruits all the year round, but the fruit is most luscious during the summer and when cultivated in a hot moist climate: does not succeed well in the dragg parts of India. DeCandolle believes it to be a native of the shores of the Gulf of Mexico and of the West Indies and doubtfully of Brazil. All the other species of the genus are unquestionably American. The non-Asiatic orig befc

bı · nor. nati sup

India by the Portuguese Brandis tens us mit its butmese name, thimbirthi, means fruit brought by sea-going vessels. In 1626, seeds were sent from India to Naples, so that the tree must have been introduced into India at an entry date or shortly after the discovery of America, It is generally discover, the female flowers sessile, and the male on long peduncles

Sometimes, however it is monocious or the

flowers even hermaphrodite. Resin .- Exudes a white resin. (Kurz)

Fibre -Dr. Dymock recommends the fibre from the stem to be exa-

iuic

DOS Jamaicennis (Vol. II , 37) that in Jamaica it is reckoned as most inturious to the intestines: the same fruit when ripe is excellent and wholeto the intestines; the same han made the milky juice of the uniter Prout some." "The anthelminite properties of the milky juice of the uniter Prout on the contest of the uniter Properties." The attention

Fur-(Med Plants of Maureteus, 1857, p 65), and it may justly be con-cluded that the statements as to its efficacy as an anthelminic are founded on fact. The following mode of administration was employed by Dr.

gar may be added. This may be repeated two days successively if required. The above is a dose for an adult, half the quantity may be given to children between seven and ten years of age, and a third, or a tea-

spoonful, to children under three years ally " W. C. ! .

33-,

m the

RESIN. 582 FIBRE.

583 MEDICINE. Juice. 584

Unripe fruit. 585

CARICA Papaya,
MEDICAL OPINIONS.

# The Papaya or Papaw.

one or two gruns with sugar or milk after meals should be given to adults A few drops of juice added to tough meat render it quite tender and fit for immediate cooking. This is very destrable in the case of invalids. Tincture of the juice does not keep well and is disgreeable to taste. A syrup of the powder may be made if required for children and delicate women. (Surgeon R L Dutt, M D, Pulna) "The milk-like juice of the green or untipe fruit is a good digestive, and most efficacious in dyspepsia. I have frequently prescribed it with marked success. The ripe fruit is afterative, and if eaten regularly every morning, corrects that habitual constipation so common in India. The dry fruit is said several cases without

to promote the secreiot unfayourable, but I

think the good effect was chiefly owing to the maintenance of a uniform heat. However, more experiments are necessary to decide the question. The leaves should be gently bruised and heated in a pan and applied warm to the breast. The dose of the milk like juice is 30 drops, mixed with water, two or three times a day. The juice must be fresh, as it decomposes quickly, but it may be obtained by picking the green fruit on the tree and collecting the white fluid in a glass? (R. A. Barker, M. D., Civil Surgeon, Dumka, Santal Parganes). "The ripe fruit is very pleasant cating indeed. The leaves of this tree have the peculiar property of making tough meat tender. If a fowl, recently killed, be wrapped up in papya leaves for a couple of hours, and then cooked, it will be as tender as if it had been hung for 24 hours. I have seen spleen grow smaller in young persons who have been treated with the dried and salted fruit. The juice called papame has digestive ferment properties and will remove thickened skin, as in eczema and corns. It is also said to be a

diarrhea. (Attitant Surgeon Nenai Sing, annaranjur). Franju julici sused in dispepsia na a vegetable substitute for pepsine." (Surgeon R. Gray, Lahore). "It has the property of rendering meat tender and of lacultating the process of cooking. It contains a vegetable peptine and can be used as pepsine." (Brigade Surgeon F. H. Thornton, B.A., M.B., Monghir). "The junce has great solvent properties. It dropped on raw meat, it dissolves it in a few minutes. The green fruit when boiled with meat renders it tender. The green fruit is used as a vegetable. Is a mild laxative and diuretic. The green fruit is ecoling at first, but has a mild laxative and diuretic. The green fruit is cooking at first, but has a

it has rubefacient properties Hospital Assistant Gopal Chunder Gauguli reports that meat softens when boiled with the unipe fruit cut into pieces, it is also used in the form of curry by the natives" (Surgeon Annual Chunder Mukerys, Noabhally)

to possess digestive

## The Papaya or Papaw.

Papaya.

MEDICAL
OPINIONS.

properties" (P. W. B., Dacca). "The juice has the power of dissolving coagulated albumen" (Surgeon A. Crombis, Dacca). "Anthelminic A leg of mutton or a foul left under a pappa tree for a night is said to become quite tender" (Surgeon C. M. Ruisell, M. D., Sáran). "The juice is applied in psoriasis and other skin affections of a smillar character" (Surgeon-Major W. Dymock, Medical Store-keeper, Bombay). "The fresh juice of the fruit of this plant has the power of digesting meat if it is kept at about the temperature of the body. It

"iced by me in sette for Feb-"The juice "y good for m" (Surinpe fruit

which is analogous to pepsine in its physiological property, and has the virtue of dissolving all azotised matter. Its action on muscular fibre is peculiarly

unripe fruit in many cases of enlarged spleen, but have not found it an

irritant and is applied for the same purpose to the os uten" (Surgeon"John Gomes, Esq., Medical Store
uternally it produces abortion"
produce abortion Fruit eaten"

made into a curry, is eaten by women to excite secretion of milk. It also has the property of making meat of any kind tender when cooked with it? (Honorary Surgeon F Kinsley, Chicacol, Ganjam, Madrat), "Acts on the spleen" (Surgeon W A Barren, Bhuj, Cutch) "Very use-

D R. Thomson, MD., CIE,
, a poultice have an excellent
The inspissated juice of the

CARICA Papaya. MEDICAL OPINIONS

The Pagava or Pagaw.

fruit, in doces of a grain injected hypodermically, will remove the morb d tissue within the area of its contact. Tever is occasionally excited as well as local irritation, and hence this mode must be pursued carefully have used the inspissited juice also in the form of pills in 2-grain to 4-grain doses for the same disease. The result seemed favourable, but as other methods were used the matter is open to doubt" (Surgeon W. G. King, M. B., Madras) 'The leaves are used externally for nervous pains The leaf may be either dipped in hot water or warmed over a fire and applied to the painful part " (Surgeon-Hajor W Nolan, M D, Bombay) "The seeds are considered to be anthelminic" (Surgeon-Major F. Robb, Ahmedabad).

The above opinions show how widely and uniformly the properties of the papaya are believed in by Native and even by European Medical Officers. Food -When upe the fruit attains the size of a small melon, the

Ripe fruit. 580 Green fruit Curries and pickles. 590 Other modes of preparation 59I

FOOD

interior is soft, yellow, and sweetish, eaten by all classes and esteemed innocent and wholesome. When green it is cooked by the natives in their curries and also pickled The ripe fruit has a flavour peculiar to itself, the better qualities are eaten without sugar, and by many persons are ranked among the first of eastern fruits By others the papaya is eaten with pepper and salt. The seeds have a pleasantly pungent taste, not unlike mustard, hence in all probability the idea occasionally alluded to that this is the mustard tree of the scriptures Lisboa says the fruit has a sweetish taste and makes an excellent tart When boiled in Don says that in South America the slices it is eaten as a vegetable fruit after being boiled and mixed with hime juice and sugar is used in place of apple sauce. Sloane remarks that the unripe fruit is cut into slices and soaked in water till the milky juice is removed. It is then boiled and eaten as turnips or baked as apples. A few drops of the milky sap of the papaw is said to render meat tender. The author of the Makhgan recommends that for this purpose the juice should be mixed with In Barbadoes the flesh of animals is reported to be hung on the tree over night in order to soften it. This idea prevails all over India and is doubtless often resorted to by domestic servants firms this and states that he has personally tested the accuracy of the popular notion Dr John Davy (Edin Ph I, 1855) declares that this is due to accidental causes According to some writers the best plan to soften meat is to wrap it overnight in the papaw leaves, or to drop a little of the fresh juice into the vessel in which the meat is being cooked. Brandis mentions another process, namely, to wash meat with water impregnated with the milky juice. It is even stated that meat is rendered tender by causing the animals to eat the seeds before they are killed. The best qualities of papers are said to be obtained from Singapore and Moulmain stock 'The green fruit, when peeled, boiled, cut into small pieces and served with sweet oil, vinegar, salt and pepper, serves as a very palatable vegetable, and is very similar to squash in taste" (Mr L.

Julce 592

Structure of the Wood -The stem of this fast growing tree is too TIMBER spongy and fibrous to be regarded as affording timber. Gamble describes 593 it as soft wooded

Domestic -The juice is used by native ladies as a cosmetic to remove freckles it is also exceedingly acrid, causing blisters and itching if applied to the skin (Treasury of Botany) 'The feaves are employed by the Negroes in washing linen as a substitute for soap" (O'Shaughnessy)

DOMESTIC. 594

# The Blistering Papaya of Brazil.

CARISSA Carandas

## Carica spinosa,

A branching tree met with in Guiana and Brazil, has a much more carid juice than the other species. If dropped on the skin it causes disagreeable blisters. The fruit is not eaten, and its flowers have a carr drug drug.

MEDICINE Julce. 595

# CARISSA, Linn , Gen Pl , II , 605

A genus of densely branched, spinous erect shrubs, belonging to the Apocynace. There are some twenty species Aircan As ato, and Australian Sir J D. Hooker remarks of the five Indua, species that they are pro-

506

Carissa Carandas, Linn , Fl Br. Ind , III , 630 , Wight, Ic , t 426 . Apocynacez

Syn —C CONGESTA, Wight, Ic, t 1289, Bedd, Fl Sylv, Man, 156, Anal, t 19, fig 6

Vern -Karaunda, karanda, or karonda, garinga, karrond, timukhia,

D

Brandis For Fl., 320 Timb, 251, Dals & C 191, Stewart, Pb Pi Dimock Mat Med Atkinson's Fcon I rod

Tans of Beng , 142 1 Botany , Firminger, Min Gard , 256

Habitat —A dichotomously branched bush, cultivated for its fruit in most parts of India, said to be wild in Oudh, Bengal, and South India In the Punjáb and Gujarat it frequents hedges, and forms spiny, low, dense bushes, is also found in Burma, Ceylon, and Malacca

It flowers from February to April and produces a small fruit which is grape green when young white and pink when approaching maturity, and nearly black when ripe The fruit is ripe in July to August

Dye - Dr McOann states that in Bhagapur the fruit is used as an auxiliary in dyeing and tanning. The milky fluid which exudes from the

wounded part of the fruit when gathered as very adhesise. Medicine—The unripe FRUIT is astringent, and the ripe fruit recolong, and, and useful in b lous complaints. The moor has the reputation of being a b tire stomache. "It is used as a player in the Concan to keep off thes, and pounded with horsepiss, limejuice, and camphor as a remedy for tich." (Dymo & 1).

Special Opinions.—§ "It is considered to be anisscorbatic and may have due in the form of curn, and chutnes by the natives" (Assistant Surgen Annest Chunder Muterys, Noakhally), "Antiscorbane, expector-

PYE Fruit. 597 MEDICINE. Fruit

598 599

## CARISSA Spinacum i

## The Karneds.

REDICINE.

ant" (Surge n. W. Pieren, P. 19. Cet S). "The piece is creative and countries of producing of one. The upolitic is a pleasure peril, yet well with food, and has, I belove, arrived it properter" (Sugar in Major J. M. Frest, Palm et, Dental "The deriction of the leaves it very much word at the commer emert of territent lever" (Siege Migre P. N. Mukery, Catte t. Orners

FOOD rickle 600 Preserves. 6or TIMBER. 602 DOMESTIC. Fonces 603

Food. ... The fruit is my le into p kle ji t hel ee lt is ripe, and is also employed in tiets and pillings; I their prepares it is approve to any other Ind in fruit (Firminger). When ripe it I aken a very good it v (equal to redement) for which it is entire ited in the garriers exhed by l'uropeans. The natives urbereally eat the feut when sipe, and ex-

cepting picking they do not es & it.
Structure of the Wood -White, I red, smooth, eleganizated Domestic Uses,-Makes exceeds by steams for es, its rumber of strong, sharp thorns, renders such hodger almost impassable. (Avel)

Carissa diffusa, Rect., Fl Int., Fd C.B C , 231; Syn for C, spinarum, d. DC . which see.

601

FOOD.

C. macrophylla, Wall, Fl Br. Int., III, 631.

Syn .- CARISTA LANCEOLATA, Da's : C. DALERLLII, Falla, Fl Syle, Min ,

References - Data & Gits, Bom Fl 141; Lisbon, U Pl. of Frm , 145.

Habitat.-A large shrub with very strong, curved thorns, common on the Decean peninsula, Coorg (Heyne), Konkan at Ramaha (Daleell); Courtallum (Wight) The flowers are much larger than those of the other species

Food .- The fruit is exten, it is about the size of a plum and ripens in May. Beddome says it is superior to that of C. Carandas.

C. spinarum, A DC, Fl Br Ind, III, 631; Wight, Ic, 1, 427

Syn -C DIFFUSA, Rorb

The Flora of British India regards the species as probably only a state of C. Carandas, concurring in this pinion with Dr Brandis. It is mainly distinguished by its being a smaller plant, with shorter and more slender spines, more acute leaves, and a smaller berry

Var hirsuta is more pubescent than the type condition it is C. villosa, Roxb , Ed , Carey and It all , and also of It ight, ic , t 437-a form which Roxburgh regarded as quite distinct from the others described by him and of little economic value

Vern -Karaunda, HIND; Gin, garindi, garna, Po; San karunda, anka koli, URIYA, Karamadika, SAYS; Wakoilu, TEL, Kanuman, ORADN

References - Rord , Fl Ind , El CBC, 231, Brandus, For Fl , 321; Lurs, For En Ceylon 105, 16 ; al-Baden Pone four, Cyclop Bom , 166

Habitat .- A small, thorny, evergreen shrub, wild in most parts of India, especially in the drier zones and in the plains of the Panjab, the

#### The Camelian.

CARNELIAN

Medicine.-This plant is mentioned by Baden Powell amongst his MEDICINE. drugs of the Panilb, but its supposed properties are not stated.

Wood. 607

FOOD,

608

600 TIMBER.

бто DOMESTIC.

Fences. бII

Fuel 612

613

FODDER.

which is given as a tonic and choiagogue (Dr. Stewart).

Food -The fruit is eaten in tarts. The leaves are greedily devoured by goats and sheen.

Structure of the Wood .- Hard, smooth, close-grained, said when very old (in Kangra) to be black and fragrant (Brandis) It is generally gregarious, often forming undergrowth in the forests of Plaus longifolia, of bamboo, and occasionally of teak. It is used for turning and combs.

Domestic Uses. - Largely used for dry fences, but spreads so rapidly where clearances have been made that it may impede the reproduction and growth of the forest. It coppies freely and makes excellent fuel.

# CARMINE.

elifort taken to to operation

## Carmine and Carminic Acid.

CARMIN, Fr.; KARMIN, Germ; CARMINIO, It. References .- Balfour's Cyclopad ; Ure's Ductionary of Arts, Manuf , and Mines

-L -

The uses of Carmine have recently been greatly extended ployed for making fine red inks and for silk-dyeing It is the finest red the water-painter, and more especially the miniature painter, possesses. The French carmine and rouge is preferred to the English See Cochineal.

## Carnation. See Clove.

# CARNELIAN.

614

quartzose minerals into-

1st-Transparent Crystallised Quartz or Anhydrous Quartz, as represented by the ROCK CRYSTALS. These, when violet, are known as the Amethyst, and when yellow or sherry-coloured as the Cairngorm, but numerous intermediate shades also exist from red to black. 

nate this series, or Agate and Chalcedony are used as synonymous terms, 3rd-Uncrystalline Semi-transparent to Opaque Hydrated Quarts .-The OPAL may be given as the type of this group.

## CARNELIAN.

## The Carrelian.

#### QUARTZ.

EXPORTS

615

The quartame are new sections to a set make an arctime are extensively und in Inta I recommental part a ca, in the lay farm fact, in decrease tien architecture, and in the manufacture exchangiewe ery. They are I is that a signed a poor or with the "lifter or gong" - the diamont, tules, any place, emerally peach for the benefit or has the figures and gong." So need the benefits of oppositions and gong." So need the benefits of oppositions a condition to the conditions of the benefits of oppositions a condition to the conditions of the benefits of the bene to them, becaver, a post on with the sens, and not eda to git coour-flashing epil is one of the protest of ill at new. The growth we minerals were apparently rocknown to the arrests, and when feet brombt to their a tree en obtained fat it is prices. Play ment in a that framents of a small Can bay cup were exhibited in the steament North "as it," and is Pliny," they had been the aires of no less than Alexarder the Great himse !." Balfour cen reke mich mu h truth it se t'am miest the people of India the Inferior peres are held in but I the extrema they value a gem for its intereste price, but for the workman's skill expended in stap ngit, in which the chief satured all the infector pressures as " While this is so the trade in the elliners right a both internal and foreign is far more extensive than it is possible, with our present means of determining, to definitely express. Indeed, the utmost that can be done in this direction, is to remind the reader of the elaborate decorations of the Taj Mahal of Apra and of the other similar memerials of the Moghul Loop re, in order to convey an idea of the extent the art of lapidary decoration prevailed during that period, and to add that there is little to Justily the con-

for its chern lipidary work, while industry in ornamental stones. The of the loreign tride in certain of the of the Indian lapidary industry.

known under the generic name of ma-hu-ya

EXPORTS FROM INDIA OF INFRIDE GEMS—Under the heading JADE STOVE Burma is said to have exported, since the beginning of the present decade, the following quantities and values—

		YEARE							Quantity.	Value	
										cn t	R
1880 81					_				-	3 371	8,03,590
1881 82	:				- :					3 371 7,788	23 01,800
1882-83				-		- :		٠.٠	- 1	4,159	9 00 900
1883-84						•			٠.	3,849	8,12,960
									٠,۱	3 738	5 60,050
1885-86						-			J	3	950
1886 87											_
•					1			•	$\cdot$		50

Thus during the pist set half a million of pounds sterling

Burma

Experts of Inferior Geris

CARNELIAN.

ex lucyely to China and the Strace Stratements. The does not of course in late the expects from the more (in Most, and its richt) by land to Aumann fich that. Dr. Anderson, for example, in his journes to Auman describes the servimental industry in pide at Momen, where the stone is worked into commences. The Administration Reports of first the flutting, which and exclusively with the Apriliance of the trade in jude which comes down the firmand his of Rangion, all ule to jude as one of the strading richt of the local trade in 1831-5 is exceptivated Bang percent. The expirit, trak good 7 (4) per cent, could be 2 (6) per cent, and jude-stone 3 (3) per cent.

EXPORTS.

jade, in took cray als, and in the nober gems may in the future be con a derally extended. The except and the earment of the trade in 1881 32 was due to the discourse of a rew mean like decreased it followed accounted for by the jade thus section to the market having proved much interior to the stone up will exported.

An inferior quality of judestone is also found at Mirrapur, and a very considerable trans-frontier trude is done in the Panjib in Krakan jude from Turksian, and in jude and imittuons of jude or false jude from Kashmir. (See on a further page, under Adare, variety flatma)

"We have alluded to jide in the precent connection, not from an entablished bet dithat it belongs to the quartrone group of minerals with which we are it present decling, but because it is one of the so-called inferior germs. The chilectory and reck crystal germs, however, are defined to the chilectory and reck crystal germs, however, are defined to the chilectory and the so-called inferior germs and the chilectory and the solution of the chilectory and foreign trade. The prehips the most interesting of the entry account of the Cambry and and industry in "Cambry stones" and Edjiphi Carnelania via written in 1787 by an explorer—Dr. T. Howe-who has no obtained from the writers of the past hundred years the high bottom of the cambra the chilectory and the consecution of the present of the past hundred years the high bottom of the chilectory and the content of the past hundred years the high content of the past hundred years the high content of the past the present of the past hundred years the high content of the past hundred years the high content of the past the past that the present of the past hundred years the high content of the past that the past the past the past the past the past the past that the past that the past the past the past the past that the past the pas

and with China in peril shaped stone, as large as a postol ball

Trom Wisburn's Oriental Commerce we learn that the sales, during
the Honourable Last India Company's time, fluctuated as much as they do
at the present day. The average is now, however, much higher than
during the first few years of the present century.

The following figures give some idea of the trade .-

The exports were valued in-

									R
1804 at									49 140
1803 at	٠		•	•	•	•		•	54 240
Passing over	r 70	years	they	were.	חו				
1874 val	ued a	it.	•						84,370
1878 at				٠	•				
but the ret	urns	for th	ie fiv	e year	rs end	ling 1	878 s!	OW	
an ave	rage	of	•	•	•	•	•	•	70,000

### CARNELIAN.

### The Rock Crystal,

We must now describe, as briefly as possible, the principal quartzose inferior gems -

1st -ROCK CRYSTAL, Mallet, Mineralogy, 62.

Vern — Bilaur, Hind., Phatak, Gujrati i Tansala (smoky Cairngorm),
Pn The Burmese name for an Amethysi signifies "erg plant, Supphire"
References — Bully Econ Geol., 501, Bulfour, C, cl. of India, Bomb
Gao, VI, 201 'Naton's Burma (1600) of 579, Calcutta Jour hat
Hist, Il Vadras Jour, Lt and Ex., MI, 172, Mysore Got., 173,
Central Pao. Ga., 305, Oldham, Jour As bec, Leng, XXIII, 711.

CHARACTER OF —When pure this mineral consists chiefly of silice acid, it is an ovaide of the carbon-silicen group. The differently coloured forms of rock-crystal one their thits to the presence of simil quantities of foreign minerals. These coloured crystals are known by virious names such as the Amethyst, Cauringorm, Rose quirtz, Pellucid quartz, False-lopaz or Citrine, Smoky-quartz, Milky-quartz, Prase, Aventurine quartz, &c.

COLOURING OF.—Artificially, all these and many other shades are, how-

sapphire. The following account rock crystals is reproduced from

Dr. Baltour's of the peatedly not a tructure of cochineal, it becomes a ruby, if into a tincture of cochineal, it becomes a ruby, if into a tincture of reasonal, it takes a deeper red tint, into intuitive of saffion, a yellow, like the topaz, into a tincture of tincture of tincture of tincture of the topaz, into a mixture of tincture of tincture of tincture of the merald." Crystals coloured red are known in France as rubacts -felse vibias.

avery
nd at
ar as
orted

ans uncometrizing great beauty and variety have been reported from the Rajmana. Is in Bengal I. It is a second in the Gurgaon, Bannu, Shahpur, and revisals of a large size have been found

large crystals are found in their country Milky-quartz occurs in Mergui

ECOYOMIC USES AND MANUFACTURES OF "The lapidaries of Veilum have the reputation of being skilled as workers in the different varieties of leaf found in the district and the carringoms."

abad ring Sam-

loot of the Delin palace at a cut in transparent quarts were found. These are supposed to the been cut out of large crystals found at the Arvali quartates in the neighbourhood. The Shane of Upper Burma are said to be experts at making instation gens from rock crystals,

C. 616

BOCK CRYSTAL 616 The Agate.

CARNELIAN.

617

## and -AGATE, Mallet, Mineralogy, 70.

The name Agate is supposed to be derived from the acl ates (dydrus) runs isoil, or from akik, a river, in Arabic Ac ute Fr. Achat, Genn., Akik, Ann, Yamn, Hinn (acate), Chalmak (1 fiint), Hinn), Mink, Hinn (cut agates and beads brought from Kandahár), Aishar, Hinn (Silica), Pathann, Hinn (blood-stone)

They are commonly known to Europeans as Cambay stones or Goda-

very pebbles

Sources -- Ind an Agates are mainly obtained from the mines of Rewa Rantia in the Bombay Pres dence, but they exist also in Bengal in the Ranmahil and Singbhum districts, in Hyderabad, and in the Certial

Provinces at Jabulpur,

Mr. Osmphell thus writes of the Bombay Agates —"Four Agates—the common, the most, the Apada any, and the vented—rank rest to the Rij pipla Carnelian. The common Agate is of two kinds—white hill clear stone called dolo or their amdar, and a cloudy or streaked stone called pano. The colour varies but it spenerally a prepair with the Both kinds come from north cast Kithiswin, near Maledpur in Morat, three rules from Tankira. Of the stones which le in missine Pocks near the surface, the most perfect do not exceed five prounds in weight while those inferior quality, in many cases creaked weigh as much as year pounds. The colours will be held.

to gather t

Taket CCC 1 has been as a fire two table and to meet remitted Kota, three miles from Tankins in Mins. Found in the pain about two feet under the surface in miss so haves often crasked on firemassic appoint to first pounds in seed; they are pathered in the same was as a pound to first pounds in seed; they are pathered in the same was as a pound to first pounds in so ked up they take as fee points, it is not not been first as the time on a base of crass also tentimes clear, some mes of cafed, trained as as if dark tenen or red trook mass.

"He des from the town of Krhaddarjin Kara where, as a strainshows, the Kapadunj and easte child the first is a reaster. In the the brid of the set Mijam Letwenthey agreed Am afra and Might Avakadust is mike from karal anj it as further the thinton in the ledwed evers in number in the set of the dispersion of the point to ten points in we bit. The studie comes for the col-

same es ared rime e rim ... dr sen!

"The most solved Carlons on the needed on or for the correform Requering the cloud. I add reactions and in politics of national adders. The ethnic appointment of the action of in the name was as measured and all and the attentions.

#### CARNELIAN.

## The Agate.

AGATE.

showing either a dark ground with white streaks, or dark veirs on a light black ground."

CHARLETS OF.—Agaies are concretionary masses or nodules, which occur usually in hellow or veins in videnar crocks. When cut recost the sections show layers. "The colour mathings are often in concentratings of varying ferms and intensity, or in straight parallel layers or bands. The colours are chiefly grey, white, yellow or brownish red." The composition of most of the forms of agate and carrelian is from 70 to 96 per cent. of silica, with varying proportions of alumina, coloured by

oxide of iron or manganese.

COLOURISO or.—When the colours are indistinct or not deep enough they are teadly intensified by artificial means. (To says: "Bl, boiling the colourless stone in oil, and afterwards in sulphuric acid, the oil is absorbed by the more portous layers of the stone; it sub-requently becomes carbonised, and thus the contrast of the various colours is heightened. The red sarreties, also, are artificially produced by boiling them in a solution of proto-sulphate of iron; after which, upon exposing the stones to head, perovide of iron is formed, and thus red bands or rings of varying intensities are produced. Carnelians are thus very commonly formed, the colouring matter of the true stone being a perovide of iron."

the stones which should be treated as forms of agate. The following are

those most frequently described as such (separating the Carnelian by

1. "Mocha stones, originally brought from the East, are clear greyith chalcedonies, with clouds and dashes of rich brown of various shades. They probably one their colour chiefly to art." Macha stonesare found in Dekkan traps. Irving (Med. Top. of Ajmere) mentions them as found in the bed of the Chambal.

"

blood drops.

the Schwe

in Upper her as brought down the Indus on raits floated with inflated skins to Attock. It is then conveyed to Bhern, where it is extensively employed by the lapidary culters. Plasma has been reported as found in the Mizam's territory south to the Bhima rivers and Or. Voysey mentions a

form of plasma as seen in the Dekkan trap of the Sawilgarh hills.
5. "Chrysoprass, found in Silesia, is an agate coloured apple-green
by ovide of nickel."

6. The Scotch Pebble or Fortification agate.—This is a form known

chiefly by its zigzag pattern.
Uses or.-Agat-----

poses. These are many sword hilts, beads, paper-cutters, &c., & . . .

The Carnelian.

CARNELIAN.

ing in marble and to a certain extent are so employed at Agra and other places, where marble plates, boxes, &c, are made. Agates are also used for butnishing gold and silver and by the book-binders; they are made into the finer mortars used by the chemist, as well as employed for the prots of chemical balances, &c.

Some doubt seems still to exist as to the material of which the murhime cup which Nero paid 150,000 for was made Professor Muller seems to be of opinion that it was flourspar, but Ball very properly comments upon this opinion: 'si it was obtained at Upin or Ouzen, or and other locathy within the trappean area, it was almost certain to have been one of the chalcedonic minerals, vis, carnelian or agate. Flour spar is not known to occur in the trap.'"

3rd—CARNELIAN (from Caro-nis, flesh, in allusion to the colour);
Mallet, Mineralogy, 72.

et, Mineralogy, 72.

# CORNALINE, Fr. ; KARNEOL, Germ.; CORNALINA, II.

References. - Ball, Econ Geol, 508, Balfour, Cycl, I, 555 & 583 Encycl,
Brit, I, 277, Ure's Dict, Arts, &c., I, 656, Baden Powell, Pb Prod,
97, Copeland, Bomb, Researches, Thomson, Blad Jour, Lit and Sci,
V, 161

Mr. J M Campbell, in his Gasetter of the Cambay States, gives an instructive account of the history and present position of the industry in agates and carnelians. Space cannot be afforded to do more than to single out, in the following remarks, the prominent features of that trade, the reader is referred for further information to Volume VI of the Bombay Gasetter. The works and Journals referred to under Agate may also be consulted.

CHRRCTERS OF —Dana defines the carnelian as a reddish variety of chalcedony, generally of a clear bright tint, but it is sometimes of a yellow or brown colour, passing into common chalcedony through greyish red

White carnelians also occur and are prized, but they are rare
SOURCE — The reason of Ritanpur in the
mainly from
and from R
Mergui, and abundantly so in Japan

ARTIFICIAL COLOURING OF AGATES INTO CARNELIANS -While collecting the pebbles the miners divide them into two primary classes-

mora
yellow
bring out their colour. "During the hot season, generally in March and
Appl. the stones are spread in the sun in an open field. Then Mar

bring out their colour. "During the hot season, generally in March and April, the stones are spread in the sun in an open field. Then in May, a trench, two feet deep by three wide, is dug round the field. The pebbles are gathered into earthen pots, which, with their mouths down and a hole broken in their bottoms, are set in a row in the trench. Round the pots goat or cowduing cakes are pield, and the whole is kept burning from sunset to suntise. Then the pots are taken out, the stones examined, and the good ones stowed in bags. About the end of May, the bags are

CARNELIAN

CARNELIAN.

# The O ye set the fateur

CIERRITA

ere this hold through the tent of each type end of the large of the la

l'ess us ma Carnel uns ain exten in y a dif e endia. Many of the antique sema air segraved an east "an

044X.

## 4" -ONANA Maile, Meneralizy, 71.

The Once recembles the angle expect of very, of mention in the fact that the constraint entered in first entered in the format in the One of the constraint entered in the first entered in the first entered in the constraint entered in t

the underlying layer of a diep from a made to form the ground, the firm

red carnel an Irvine, in 115 die graphy of Americ allades to onst as fo mid in Rajputana. Mason anys: "The Onys often seen in Burra, but the localities whence it comes are not known." This merallas, boatout the localities whence it comes are not known." This merallas, boatout the localities whence it comes are not known." This merallas, boatout the localities whence it comes are not known."

· 1d1,

JASPER. 620

# 5th-JASPIR; Mallet, Mineralogy, 76

JASPF, Fr., JASPISS, Germ & Dutch; DIASPRO, II , JASCHIMA, Russ

References -Mason's Lurma, 5\$1, Pall, Econ. Geo', 523

As Iready stated this stone has been referred to the present position more as a matter of concenence than of scientific classification. It is a guartzone mineral of a red or yellow colour. The former occurs among the Cambay stones from the Dekkan, and the inter is found in Tentiserim. A soft green paper and also a striped paper are found in Burma, and known as na geathers of maga the dragon, and fine bloody! Mason says. "Jasper is regarded as a variety of quartz, and is not uncommon I have met with yellow paper on the Tensiserim, and red paper on the Toungoo Mountuns." Jisper is abundant in the transition rocks of Kadapah, ribbon pasper is said by Mr. Foots to be truefy produced in the Sandur hills in Bellary. Bright red paper is also reported to be abundant in the transition rocks of the Narhada and Sone Valleys Nodules of pasper are also common in conglomerate rocks.

## The Onal and the Cat's Eve

CARNETIAN

Uses or -Sometimes employed for scale

merely in being snotted or streaked

JASPER The HELIETROPE is by most writers treated as a form of rasner, but by HELIETROPE some it is regarded as a form of bloodstone (see under Agare No. 617) It may almost be said in general appearance to differ from green jasper

6th-OPAL: Mallet, Mineralogy, 80.

OPALE Fr. OPAL Germ . OPALO, It . Dhidia tathar HIND Chalcedony and Opal are sometimes known as Gomed

sannihh Hinn This is a compact uncrystalline semi transparent, to engone hydrated OPAL. 621

CAT'S EYES.

silica When of milks white colour, opalescent, and exhibiting a rich play of colours, it is the Noble Opil When not opalescent it is the Common Otal The former are obtained chiefly from Hungary and ig come

na, and , ore and

Sitabaldi

On being first dug out of the earth opal is said to be soft, and to harden and diminish in bulk on being exposed to the atmosphere.

7th-CAT S EYES, Mallet, Maneralogy, 60.

622

This stone is perhaps closely allied to Onyx, but by some writers it is placed nearer rock crystal It is a translucent quartz, presenting a necuhar opalescent reflection, said to be due to the presence of ashestos is called cat's-eye from the resemblance it bears to the eye of a cat, an 1. their name for the stone, he stones are common and

are found are not known " Malabar Coast is generally accepted as a form of cat's eyes They are sent from Cambay to Bom

ecu vers

Rori and Lussunid are names given to a much valued pebble, found scantily with cat's eyes in the Rajpipla mines of Bombay (Select Records, Bomb , New Series, No IV , 31)

LAPIDARIES' ART

It is not proposed to deal with this subject in the present article, it having been deemed desirable to give in one place under "Lapidary" an abstract of all that is known regarding this industry, not merely as

gems -Bom Gas, VI, 201. Hoey, Trade and Manuf of Northern India, pp 54 and 119. Baden Powell, Pb Manuf, 192. Kipling, Cat Cal Intern Exh , Pb Section, 28 . Burma Admin. Rep , 1882-83, p 64 . Hendley, Indian Art Journ , Part 2, 28

The above account of the inferior gems was in type before the writer received Mr Mallets Vol. IV of the "Manual of Geology of India" Carpits and Rugs.

Arnes.

CIRLETA

im a cite. There are depresting to race it any bushas arms alterestly. Aft met, a was often on the Frete in out of them will per a mon of exemple merg. By the series and will believe to not exply from threasing Birt + carrie 1 and to to cope wearing arm of a miner sem facilist man et many court fifte then the east proposed bushand the Morris or the me be an thet else erre from etal a green article ear re far mit els sont la me in the sal which area ereselve and ringles e new and young the i wm ner I elfammera nit ciera colemistre cry t carat ch tale It miter the very state to my per entry en pe ved we knewn the employeeman of empress banker a to expose. Or if the ill tree the profession is estantive title and configuration to exempt of the will be supplied to the procession of the organization of the procession of the process maggantes acmouses for safes a walled to go be may be moved by the the interior to only the worse electric for which there exist any to be a seguine elemant. It is the every text there was party to all miterialists. Carpete at and also self sent superior a scoop you be more for n a coly ch to I next to anta tomers as elect by but they make obnite the see direct. Werete to expet ettere elicera if the e well their, ar torreaction from ever edd is either einter attempter to ta greater and ety of gat enogt an each achre a have con one if it emthe first with it at the first or a proprietary. A should be expected with a smooth the to the first the son he and contine about reverse spone are justene and file tion mantrig and the coch groute of the colors are ground and the of night ate chapmeer it c, there w . to as ale no until meet este. The ist shave me Aga teen which is tell " wellt to faite gite in far mil militie. go is the drage me it eatings are "alle" at "a" as emmaking rich of the properties eta mentat ten bural everpte teld. Ant mellen pa ive dia anera Are the at 'this mere me nateners. In the tent l'ere in corpers and then of Warangal, which, though made in Silvern fed a, are really of Persian unight, prescrip as the e-fron prints of Mara' param are who recal in time and partern with the "prescripes" of Teheran, the designs are tel fand full of sames, each cusp's persons and a de new se character an I key-rote The earth and on issis gring if both is eard indom trial school and man to serve to promore much fer at a furure; total month's of a larger and more art so equal to all dry an are to lowed it may be that in time the natural aprilu in fee it sign which will exist will arain be deve oped" (7. Kep'erg, Frg , C I F .in Ph Gos , Horbsarpur Dit' , P. 111)

Much dit eren e ce op a on secons to presaltam nyst writers on Indian pile exercise as to the position this industry occupied 30 or 40 years ago. Mr Vincent Robinson, at plans the siews also at-1 by Sie George Birdwood in his Indian dees, Lays a large stare of the acknowledged dependent in to it a charge of the Indian fulls. In his paper read before the So et al Arts (Murch 19th 1815) to says 1" I wenty scare agothe reputat in id India for its carpets having been established in Furope at the test tal tu n of 1951, and subsequently well developed to private enterpri e-the Government of India, casting at out in the middle of diff. culties with taxit en tlundered on the scene" and introduced carpet manufacture into the jais in the hope of thereby making these at least self-supporting instead of a hurden to the country | He continues; "I have already shown that the reputation of these carpets was not a fresh creation. it was an art upon the printing of which thousands of our fellow-subjects in India depended for their Lielihood It had its traditions, its methods, The Government, through the hope of gum, rushed into the resuscitated industry 'Buildings were adapted, plant on so-called improved I nglish or Luropean models obtained and fixed, and the armaCarpets.

CARPETS AND RUGS.

ments of chemical laboratories with their processes introduced; and such a system of organised work set up as completely transformed not only the trade but actually the carpets themselves which were the foundation of it.

CARPETS.

sect, who are said to be descendants of Persian settlers. So in Bombay, and indeed in most parts of India, the weavers are to this day Muhammadans

created such as exists. It was not until the Exhibition of 1862, that the Panjab was known beyond its border for the production of carpets, and then only by the productions of the Lahore pail executed for a London firm. There exist no specimens to show that the Multan industry, the only indigenous one of the province, was of either artistic or commercial importance. The success of the Lahore pail led to the introduction of the

the influence of the Government Schools of Art and the juils buf at the present I feel that it is chieffy due to the influence of English commerce on the historical handicrafts of India." This seems a much more likely explanation, and that a considerable trade was done in western and southern India, in Indian pile carpets, previously to the Exhibition of 1831, is undenable. Reference is repeatedly made to this trade in the records of the Hon'ble EastIndia Company's proceedings. This, for example, is allieded to as follows in the Gazetteer for Cambay:—

"Cambay carpets had once a great name. Among the articles mentioned in the proclamation of 1630 'for restraining the excess of private trade to the East Indies,' are rich carpets of Cambay. Later on a chef part of the Senior Factor's duty at Cambay was to buy carpets 'valuable in Europe,' and in another place Cambay carpets are spoken of as egual to any of Turkey and Persu. Though this trade has greatly fallen off, there are still four carpet factories, each paying the Nawab a vearly tax of 1,1-10-0 (fils).

That the extent and character of the Indian pile carpet trade has declined is all but universally admitted

Pile carpets are made of cotton at Hyderabad and at many other places, tufts of cotton yarn being used in place of wool. In the same way expensive pile carpets are made of silk, but more frequently silk is used.

to be fetch

higher prices than the others"

Pile Carpets ARE MADE at a limited number of Jails in each Presidency and Province and by a few private manufacturers scattered here and there over the country. The references given to the Gazetteers convey some idea of the distribution of the industry, but it may be concluded that

## CART AND CARRIAGE BUILDING. Woods used for.

#### PILE CARPETS.

Agra, :

Masul

abad and Benares are best known.
For farther information the reader is referred to the articles "Cotton,"
"Hair," Pishm," "Silk," and "Wool" For the dyes used in carpet
making to the article "Dyes and Dyelka,"

Complete information as to the places at which various kinds of carpets, totton and wollen, are made can be obtained from the authorities of the Indian Museum in Calcutta.

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# CARPINUS, Linn.; Gen. Pl., III., 405.

Carpinus faginea, Lindl.; DC. Prodr., XVI, 2, 127; CUPULIFERE.
Vetn.—Shirash, imar, bijavni, PB; Glsh, N-W. P.

References .- Brandis, For Fl , 492; Gamble, Man Timb , 390

Habitat.—A moderate-sized tree of the Himálaya, from Kumaon (and Nepal?) eastward, altitude 4,000 to 7,000 feet.

Structure of the Wood .- Similar to the next species.

тімвен. 630 *631* 

C. viminea, Wall.; DC. Prodr., XVI, 2, 127.

INDIAN HORNBEAM. Vetti. -- Charkhri, kai, PB.; Pumne, goria, chamkharak, N.-W. P., Chukisii, konikaki. Nepal.

ROTHERIN, NEFOL.
REFERENCES.—Brandis, For. Fl., 492; Kurs, For. Fl., Burm, 477; Gamble,
Man. Timb, 390, Stewart, Pb. Ph., 200; Buden Powell, Pb. Pr, 572,
Balfour, Cyclop.

Habitat.—A moderate-sized tree of the Himálaya, from the Ravi eastward, from 5,000 to 7,000 feet, frequent near water. Also met with in the Martaban Hills, alitude 5,000 feet, and, according to Brandis, on the Khasia Hills.

Structure of the Wood.—White, shining in heartwood, warps in Structure of the Wood.—White, shining in heartwood, warps in seasoning Weight 50b per cubic foot, growth moderately slow. The seasoning Weight 50b per cubic foot, growth moderately slow. It is set in stretch that of the European Hornbeam, which It much resembles both in birds, wood, and general appearanch. Clighorn states that it is much esteemed by carpenters.

Carrot. See Daucus Carota, Linn.; Unbellifera.

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# CART AND CARRIAGE BUILDING-Woods used for-

During the Colonial and Indian Exhibition two conferences were held to examine the timbers shown in the Imperial Indian Section. Mr.

## The Safflower.

### CARTHAMUS tinctorius.

hot dry weather of the north seasoned the wood in a way very much superior to the artificial methods employed in Europe" The following are the timbers used in India for these purposes, more especially those marked* -

Acacia ferruginea (carts) A. melanoxylon (coaches, railway Albizzia amara (carts) (carnages) Barringtonia acutangula (carts)

B. racemosa (carts ) Bassia longifolia (carts ) Berrya Ammonilla (carts)

Briedelia montana (carts) B retusa (carts) Calamus Rotang (carriages)

Careya arborea (carts). Cassia Fistula (carts) Chloroxylon Swietenia (carts)

Cynometra ramiflora (carts) *Dalbergia latifolia (wheels, gun-car-TIRECT!

*D. Sissoo (felloes, naves; carts). Diospyros melanoxylon (carringe Eugenia Jambolana (carts). [shafts) Ficus bengalensis (cart yokes)

Gmelina arborea (carriages, palanauins) *Hentiera lutoralis (buccy shafts)

Hymenodictyon excelsum (palan-

*Lagerstræmia Flos-Reginæ (carts, gun-carriages)

*Lagerstræmia parviflora (bugg) Melia Azadirachta (carts ) [shaits) Michelia Champaca (curriages) Milinsa velntina (carts) Mimusops Elengi (carts) Prosopis spicigera (carts) *Pterocarpus indicus (carts, gun-P. Marsupium (carts) [carriages] Pterospermum suberifolium (carts). Sandoricum indicum (carts) Sapindus emarginatus (carts). Schleichera triggea. Shorea robusta Strychnos Nux-vomica.

S potatorum. Tectona grandis (railway

Terminalia Arjuna. (riages) T. beierica.

T. Chebula. T. tomentosa.

Thespesia populata (carts and carmarcel

Ulmus integrifolia (carts). Vitex altissima (carts) Xylia dolabriformis (carts). Zizyphus zylopyra (carts).

CARTHAMUS, I inn , Gen Pl , II , 483

Carthamus oxyacantha, Bieb , Fl. Br Ind , III 386, Coxrosite

Vern -- Kantieri kandiára foli, khárese karar, fol yán Pa References -- Siemari F. H. 133 j. Alchison Cat., P. Fl. 83 j. Baden Powell Ph. Pr., 355, Cook. Os and Outerds 34 j. Ba (ms, Cyclop

Habitat -Wild in the North-West Proxinces and the Panjil, most common in the more and tracts. Mr O B Clarke thinks this may be

the wild form of Safflower Oil -Dr Siewart says that year Peshiwar and elsewhere in the Panjáb, an olis extracted from the seeds which is used for a am na ng purposes, as well as for food. Dr Stocks probably a udes to the when testing, under the ol from the seed of C. Lactorias: "There is a wid

seed in S nd "which is also called Powarf, L tit is of no use " Med doe -Dr. Bellew remarks that the oil is used med ora"y Food -The seeds are somet mes ra en ha the na ses parched, all re

or with wheat, or are ground and mixed with whealen four.

C. tinctorius, I irm , F. Ir Int. III , 500

THE SAFFLOWER, WILDOW BASTARD SAFFEON, AFRICAN SAFFRON, ARTRICAN SAFFFON, CARTRARISE DIE Fee / CARTERY SAFRAN BATARD, Fr. DER SAFFICE, PAREITE STILL PALS ME WOOD USED FOR CART AND CARRI-AGE BUILD-ING.

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RED'CINE

633

CARTHAMUS tinctorius.

#### The Saffower.

SAFRAN, Germ.; ZAFFRONE, CARTAMO, II. & Sp.; POLERROI.

Vern .- Kusum, kasumbo, kar (the seed), barre, HIND.; Kusum, kusamphul, kajirah, Beng ; Galap machu, MANIPUR; Kusam, kurtam, kui, RATE kasdi. (seed),

a mrai. nbe (or Ausamoij, Autumoi, dan ; éiesoa, 311, usnu, supan, suban, Burm ; Gurtum, girtum, usfar, Anda ; Kashirah, musifi, kasakdanah, Pens ; Kusumbha, kamalottara, kuskumbha, Sans ; Kurtun, Edypr. The KPHKOS, KPIKOS of the Greeks.

In Sind the seeds are called Kardal (kurtum), and in Panjab Khar, polian. EJCPC e e Ci ani ni ni

References - Roxb , Fl. Attchison, Cat , Ph Pl , riff, Supp Pharm Ind

Indian Dyes: Neport 1882-83, p. 21; Crooke's 300, Duthie & Fuller, I 51 ; E James, Ind. It

gra), 154

Habitat .- An annual, herbaceous plant, with large orange coloured flower-heads, cultivated as a dye-crop all over India, also in Spain, Southern Germany, Italy, Hungary, Persin, China, Egypt, the Sunda Islands, South America, and Southern Russia. Some doubt seems to exist as to the origin of this plant. It has never been found in a wild state, but botanists assign to it an origin in India, Africa, or Abyssinia. De Candolle (Origin, Cult. Pl) says that the grave-cloths found on Fgyptian mummies are dyed with carthamine. The Chinese received the plant only in the second century B C; when Chang-klen brought it bick from Bac-triana. The Greeks and Latins were probably not acquainted with it, although Birdwood and other writers give kvijkos as its Greek name. As 1 ... - 1 - 1 - -- 1 ... although pro-

· Candolle The knowidia to be

modern-a fact opposed to any idea of the plant having been first cultivated in India

## CULTIVATION

A few years ago Safflower was an exceedingly important substance, but recently the aniline colours have driven it almost entirely out of the European market. "It still, however, holds its place with the natives as a brilliant though evanescent dye, and as they employ it largely for home use, it must still rank among the industries of the country, as Sarino · I source of oil. Al hough ocras onally sown broadcast as a primary crop, safflower is

CULTIVATION 638

C. 638

CARTHAMIIS The Safflower. tinctorius. chiefly grown as subsidiary to some other crop, participating, therefore, CULTIVATION. in the treatment given to its associate. On this account it is extremely difficult to obtain trustworthy details as to the area under safflower, the method and cost of cultivation, nature of soil necessary, or value of the RENGAL. (a) In Bengal it is chiefly grown in the Eastern division, where even still 639 it constitutes a crop of some considerable value, although greatly decreased through the introduction of aniline dyes. In fact, the Indian safflower Sown Oct. to Dec. industry may be regarded as ruined, at least for the present, but similar fluctuations have occurred with other dye-stuffs, and it is quite possible the safflower trade may be resuscitated Of Indian safflower, that from Dacca bears the highest reputation. It is there sown from the middle of October. and later sowings not till the beginning of December The period of sowing varies slightly in different parts of Bengal . in Chittagong, for example, it is reported to be sown as late as January. Low churs are, as a rule, preferred, and especially where these are either new or have been left fal-- to b the the nount of moisture. it receives three ingly chiefly culefully needed for until it attains a height of one foot, but very injurious afterwards, as it extracts the colour from the flower-heads. It is a common practice to nip off the central bud Gathered March to May. even till May. In removing the florets, the flower-heads are not much injured, and as they ---J. J. L. f ' removal, the seeds continue to mature , one seeded fruits, and are ripe in April ted for the oil crop (Agri.-Hort Soc Journ , 111 , 191) Area.

crop;
gram,
seed is
howeve,
under this crop in Bengal, but the following figures are quoted from
Dr. McCann's work (which is taken from the official returns sent to the
Economic Museum). Dacca, 11,500 acres, Gya, 2,260 acres; Monghr,
2,000 acres, Midnapur, 15 000 acres, all other districts about 2,000 acres.

. The state of the

(b) In the North West Provinces and Oudh, safflower is not so exten- N -

the North-West Provinces is annually under safflower, and it has been computed that the total area under this crop is about 18,000 acres, of which

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CARTHAMUS tinctorius.

The Safflower.

CULTIVATION

38 per cent, is irrigated land. The mode of cultivation is very similar to what has already been described for Bengal. Light soils are preferred; the plant is rarely grown alone, but is generally sown in the gram fields and disposed like rape in lines. It is extensively grown along with carrots near wells, participating in the rich cultivation bestowed on the latter. It is also associated with cotton, wheat, or barley. In the North-West Provinces the sowings generally take place in October to November, so that the erop is obtained a little earlier than in Bengal,

Oct to Nov.

"Lightning is popularly supposed to do great injury, if it occurs while the heads are in flower, and the plants are reported to suffer occasionally from the attacks of an insect known as the &I, the scientific name and affinities of which have not been ascertained." (Duthie and Fuller). In a report on the dyes and processes of dyeing in Ajmir it is stated that about 20,000 manufa of safflower are annually received from Delhi, the

Price. BOMBAY. 641 a report on the dyes and processes of dyeing in Ajmir it is stated that about 20,000 maunds of safflower are annually received from Delhi, the best quality being valued at R30 a maund and the inferior sort at R24. (c) In Bombay it is reported to be cultivated in Abmedahad, Karran, Surat, Násik, Khándesh, Sholapur, and Broach. Lisboa says the cultivation "is very expensive and unremunerative if carried out by useff. it is.

Surat, Násik, Khándesh, Sholapur, and Broach. Lisboa says the cultwration "is very expensive and unremunerative if carried out by itself, it is,
therefore, almost always grown as a subordinate crop along with barley,
gram, &c., to which last the culturator looks for his profits." Probably

Area. Sown Oct.

Nazaw's dominions the prepared dye-stuff to the value of R12,000 annually, nearly two-thirds of which is forwarded to Bombay; and he adds that

Production.

Varieties, Sadai, of the crop is grown more for oil than for dye. In the Deccan two forms of the pla 642 chiefly for

642 Kusambyachi 643

sielding fl kisumba is for ten to cast at the

al 9//

Panjab. 644

evient, and entirely as a local article, there being no export. It is sown in September and reaped in April In the Delhi district there were, during the settlement, 283 acres under the crop, and in Hoshárpur 6,722 acres, especially in the northern part of the Garhshankar Tahiti. It is generally grown as a mixed crop in lines with gram and requires a sandy soil. It is sown in September.

CENTRAL PROVINCES. 645 (e) In the Central Provinces, a little over 6,000 acres are annually under this rabi crop, and Raipur is stated to export the dye-stuff to about R10,000 a year.

The brief notices given above regarding the safflower of Bengal, the North-West Provinces, Bombay, the Panjab, and the Central Province, may be accepted as pretty nearly correct; but the official reports for the remaining provinces and Native States are either incomplete or quite incorrect, and it seems probable that not more than 10,000 acres are under this crop in the remaining provinces of India.

Area.

#### The Safflower

CARTHAMUS tinctorius.

(f) In Berar, safflower, however, appears to be cultivated to a very considerable extent; Mr. Liotard informs us that the area under it is over 40,000 acres. This statement is compiled from official returns, but is obviously incorrect, since cultivation on so extensive a scale would indicate a very important trade, whereas we are informed that the dve-stuff In the reports from the Nizam's territories, safflower is not exported seems to be an imported article, but this is at variance with the statement of the imports from His Highness's dominions into Ahmednagar

(g) In Mysore and also in Madras it is cultivated very generally, but

only in small patches, and there is no export trade

(h) In the Prome district alone of Lower Burma there are said to be 260,000 acres annually under safflower. It is unnecessary to say this statement must be incorrect, since Burma has only a little over four million acres of arable land, of which three million acres are annually under rice This remarkable agricultural peculiarity almost precludes an extensive cultivation of safflower, since rice-lands are not suitable for this crop, and besides, Burma, instead of exporting safflower, receives annually a small amount from the Straits Settlements

CULTIVATED VARIETIES -It has already been stated that, according to Mr. C. B Clarke, Carthamus oxyacantha-a wild plant in the Panjabmay possibly be the source from which by cultivation C tinctorius has been derived. It is frequently observed that plants, which in a wild state are very spiny, show a tendency to lose the spines under cultivation This might account for some of the peculiarities of the cultivated plant (C. tinctorius), and there exists the curious fact in further support of this, that there are two distinct cultivated varieties met with in India -

(a) Very spiny form This may be regarded as the typical condition. It is known as kutela in Patna and kati in Berar, and is supposed to give an inferior quality of dye. This is the sadhs or oil-yielding form of the Deccan alluded to above.

This is known as bhuilf in Patna, bod-ki (b) Almost spineless form in Berar, murilia (or shaved) in Azamghar and the kusumbyáchi in the Deccan A superior quality of dye is derived from this form

> -The average outestimated at R15

o pay its share of

rent of land and expense of cultivation, as much as one-third of the earnings may be regarded as profit, but it is difficult to obtain trustworthy information regarding the profits from safflower cultivation, and it cannot pay now-a-days to cultivate it alone. Dr. McCann gives the profits in Bengal as from R3 to R15 a bigha.

#### PRESENT POSITION OF THE SAFPLOWER INDUSTRY.

Simmonds in his Tropical Agriculture says "The cultivation of safflower, known as Coosumban in Bengal, is receiving attention at the hands of the local Government The prosperity of Bengal, though it mainly depends upon the jute trade, is in some measure attributable to the demand for sallower. The writer proceeds to state that the value of the exports from Dacca alone, "would be from nine to ten lakhs of rupees—£90 000 to £100,000 The cultivation is said to be largely extending "Then follows "Safflower is grown, but to a limited extent, in Bengal, and does not grow promiscuously all over the district "Simmonds' work was published - 20- 201 att. from all India were only they were R6.50,827, so

established at the time A . . .

CULTIVA-TION BERAR. 646

MYSORE. 647 BURMA 648

VARIETIES.

Spiny Form. 649

Spineless Form 650

OUTTURN.

TRADE, 65I

CARTHASIUS tinctorus

The famoure.

CTLTSVATION

at process ever gate though them she he was measury and had be what he about he had been a local process. thungang court has any country a ferning ha have the fernishing

* num Cel la Sir.

to fel you of se some se mee I see in only you want now it can se a grante in a with the tite of the contract was a test the fee and It is a no as assert with as well in where is before, by the to establish The way was the standard of warm to the effect of the first feet for the standard of Par the expandes mellat to ear net anti-langit

Prise. EDWEAT. The limits are not seen a brog entrained property best force or with from the area kestan me or he on at the it, the see of the and and area of me the true of the area of A terrer on it dises and frame a see that me on Af a se se strait fair age as a sare merte je eg atas, out and and the first had and the life of the total

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Ares. Sown Oct . RAIT'S.

sur pro en than tours a sea are annual is an ter that are to mater while it the Il out as Presidency. As mixtocarlo irate aid on in thursdright, where the plane is some in air pa a log me h no ata, where, and ether are go, the arest to ng par in the prining in Or the and the complete eness learnest the Motard ita ex that the town of Name improve from the In March Numbed mine as the prepared dares offerthe value of Readers annually. rearly twind aids of which is forwarded to thombay and to alle that the neighbourhood produces about Litera with of the die. In Karatt is stated that \$1,535 maunds are arenes' y produced, it which are five mainds are used up I wally — If our flood state from It imbay state, however, that the copp is grown erice the of this fee die In the Decean two forms of the plant are grown-relin, a strong plant with therey leaves grown the fifty for we observed a knowledge A. a cheddere plant prown for its declared flowers (flowed Gos. VI. dogs. In buyers the "Last or Lighthan both in goodal and thack with the Last in plushed for ten to twenty times before the soming. The seed in thous Detach

Production, 1 Varioties. Sadht. Kusambrachi

643

east at the rate of to" to the highs and is reaped in Lebruary average yield is in seed 4mib and in flowers 8 1b" (B m5, Gas, VII, or) Bomb sy safflower is commercially much inferme to that from Bengal (d) In the Panjab, safflower appears to be grown to a very him ted extent, and entirely as a local article, if the being no export. It is sown in September and reaped in April In the Delhi district there were, during the settlement, 288 acres under the crop, and in Hoshidepur 6 722 acres, especially in the northern part of the Guthshankar Tahud. It is

PANJAB. 644

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CENTRAL PROVINCES. 645

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CARTHAMUS tinctorius.

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CULTIVA-TION BERAR. 646

MYSORE. 647 BURMA. 648

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Spiny Form. 649

Spineless

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(b) Almost spineless form This is known as bhuilf in Patna, bod-ki in Berar, murilia (or shaved) in Azamghar and the kusumbyacht in the

Form Deccan A superior quality of dye is derived from this form,
AVERAGE OUTTURY AND PROFIT OF CULTIVATION —The average out-650 OUTTURN. turn of safflower sown thickly amongst carrots has been estimated at R15 along with R5 for seed, and allowing the other crop to pay its share of

the earn-

'rustworthy d it cannot profits in

Bengal as from R3 to R15 a bigha.

amount from the Straits Settlements

PRESENT POSITION OF THE SAPPLOWER INDUSTRY.

Simmonds in his Tropical Agriculture says. "The cultivation of safflower, known as Coosumban in Bengal, is receiving attention at the sationser, known as Costumean in Denga, is receiving attention at the hands of the local Government. The prosperity of Bengal, though it mainly depends upon the jute trade, is in some measure attributable to the demand for safflower." The writer proceeds to state that the value of the exports from Dacca alone "would be from nine to ten lakhs of rupees—£90,000 to £100,000 The cultivation is said to be largely extending" Then follows "Safflower is group, but to a limited automated Then follows . "Safflower is grown, but to a limited extent, Dangel and does not are

TRADE. 65I

CARTHAMUS tinctorius.

The Saffower.

CULTIVATION

38 per cent is irrigated and. The mode of cultivation is very similar to what has already been described for Bengal. Light soils are preferred; the plant is rarely grown alone, but is generally sown in the gram fields and disposed like rape in lines. It is extensively grown along with carrots near wells, participating in the rich cultivation bestoned on the latter. It is also associated with cotton, wheat, or barley. In the North-West Provinces the sowings generally take place in October to November, so that the crop is obtained a lattle earlier than in Bengal.

Oct to Nov.

"Lightning is popularly supposed to do great injury, if it occurs while the heids are in flower, and the plants are reported to suffer occasionally from the attacks of an insect known as the al, the scientific name and affinities of which have not been ascertained." (Duthie and Fuller). In a report on the dies and processes of dying in Ajmir it is stated that about 20 000 mainds of sufflower are annually received from Delhi, the best quality being valued at 1830 a maund and the inferior sort at 1824.

(c) In Bombay it is reported to be cultivated in Ahmedabad, Kaira,

Surat, Nasik, Khindesh, Shoippur, and Broach. Lisboa says the cultiva-

Price. Bombay, 641

tion "is very expensive and unremunerative if carried out by itself, it is, therefore, almost always grown as a subordinate crop along with briley, gram, &c. to which last the cultivator looks for his profits". Probably not more than 5,000 acres are annually under this crop in the whole of the Bombay Presidency. A considerable trade is done in Ahmednagar, where the plant is soon in strips along with millets, wheat, and other crops, the seed being put into the ground in October and the crop of florets collected in March. Mr. Liotard stries that the town of Nagar imports from the Nixain's dominions the prepared dy estuff to the value of Rizoo annually, nearly two-thirds of which is forwarded to Bombay, and he adds that the neighbourhood produces about R5,000 worth of the dye. In Karra is

is stated that 41,134 maunds are annually produced, of which 25,600 maunds are used up locally. The official reports from Bombay state, however, that the crop is grown more for oil than for die. In the Deccan two forms

of the plant are grown-sidhe, a strong plant with thorny leaves grown

chiefly for its oil-seeds, kusumbyachi, a slenderer plant grown for its die-

yielding flowers (Bomb Gas, XII, 164) la Guyarit the "kabri or krisumba is grown both in goradu and black soil. The land is ploughed

for ten to twenty times before the sowing. The seed is thrown broadcast at the rate of 10lb to the bigha and is reaped in February. The

Sown Oct , gathered March

Arca.

Production.

Varieties, Sadhi, 642 Kusambyachi, 643

average yield is in seed 400h and in flowers 80h." (Bomb Gaz, VII, 97)
Bombay safflower is commercially much inferior to that from Bengal
(d) In the Panjad, safflower appears to be grown to a very limited
extent, and entirely as a local article, there being no export. It is sown
in September and reaped in Agril In the Delhi district there were,
during the settlement, 288 acres under the crop, and in Hoshárpur 6,722
acres, especially in the northern part of the Garbshankar Tahsit It is
generally grown as a mixed crop in lines with gram and requires a sandy

PANJAB 644

soil It is sown in September
(e) In the Central Provinces, a little over 6,000 acres are annually under this rabi crop, and Raipur is stated to export the dye-stuff to about Rio,000 a year

CENTRAL PROVINCES 645

The brief notices given above regarding the saffloxer of Bengal, the North-West Provinces, Bombay, the Panjab, and the Central Provinces, may be accepted as pretty nearly correct, but the official reports for the remaining provinces and Native States are either incomplete or quite incorrect, and it seems probable that not more than 10,000 acres are under this crop in the remaining provinces of India

Ares

#### The Safflower.

CARTHAMIIS tinctorius

(f) In Berar, safflower, however, appears to be cultivated to a very considerable extent; Mr. Liotard informs us that the area under it is over 40,000 acres. This statement is compiled from official returns, but is obviously incorrect, since cultivation on so extensive a scale would indicate a very important trade, whereas we are informed that the dve-stuff In the reports from the Nizam's territories, safflower is not exported seems to be an imported article, but this is at variance with the statement of the imports from His Highness's dominions into Ahmednagar

(g) In Mysore and also in Madras it is cultivated very generally, but

only in small patches, and there is no export trade (h) In the Prome district alone of Lower Burma there are said to be 260,000 acres annually under safflower. It is unnecessary to say this statement must be incorrect, since Burma has only a little over four million acres of arable land, of which three million acres are annually under rice

CULTIVA-BERAR. 646

MYSORE. 647 BURMA. 648

amount from the Straits Settlements

CULTIVATED VARIETIES -It has already been stated that, according to Mr. C. B. Clarke, Carthamus oxyacantha-a wild plant in the Panjabmay possibly be the source from which by cultivation C tinctoring has been derived It is frequently observed that plants, which in a wild state are very spiny, show a tendency to lose the spines under cultivation This might account for some of the peculiarities of the cultivated plant (C. tinctorius), and there exists the curious fact in further support of this, that there are two distinct cultivated varieties met with in India -

(a) Very spiny form This may be regarded as the typical condition. It is known as kutela in Patna and kati in Berar, and is supposed to give an inferior quality of dye. This is the sadhs or oil-yielding form of

the Deccan alluded to above.

(b) Almost spineless form This is known as bhusli in Patna, bod-ki in Berar, murilia (or shaved) in Azamghar and the kusumbyáchi in the Deccan A superior quality of dye is derived from this form

VARIETIES.

î

Spiny Form. 640

Spineless

Form 650

OUTTURN.

TRADE.

65I

information regarding the profits from safflower cultivation, and it cannot pay now-a-days to cultivate it alone Dr. McCann gives the profits in Bengal as from R3 to R15 a bigha.

PRESENT POSITION OF THE SAPPLOWER INDUSTRY.

Simmonds in his Tropical Agriculture says. "The cultivation of safflower, known as Coosumban in Bengal, is receiving attention at the hands of the local Government. The prosperity of Bengal, though it mainly depends upon the jute trade, is in some measure attributable to the demand for saffioner." The writer proceeds to state that the value of the exports from Dacca alone "would be from nine to ten lakhs of rupees—£90,000 to £100,000 The cultivation is said to be largely extending "Then follows "Safflower is grown, but to a limited extent, in Bengal, and does not grow promiscuously all over the district" Mr. Simmonds' work

from all India wer they were R6,50,8 established at the

C. 651

### CARTHAMUS tinctorius.

#### The Saffower.

TRADE.

ing." The total exports for 1886-87 were only R83,819. The following table gives the exports from India for the past fourteen years :--

			SAFFLO	OWER.
	EAR.		Quantity.	Value
			Mds.	R
1873-74 1874-75 1875-76 1875-77 1877-78 1876-79 1879-80 1879-80 1891-82 1891-82 1891-82 1891-82 1894-95 1894-95	:	 	13,206 14,222 4,050 7,062 3,698 4,077 2,411 6,675 2,293 3,003 2,533 2,167 1,598	7,\$8,905 6,\$0,827 1,63,528 3,04,672 1,4\$,805 1,86,711 1,81,456 3,\$1,157 94,754 92,038 64,492 83,083 65,991 83,819

'- 'n India has been steadily may now be pronounced antime dyes both as an . Duncan Bros. & Co. -der safflower cultivation in ď a 600 maunds of r. Indian, and of

THE DYE.

ion they dried in the stidue. are generally sold for the home maine, they are powdered and sifted. The first and last harvests are always those gathered in the middle of the season. In the former case many undeveloped florets are collected, and in the latter the plant is becoming exhausted and does not produce such brilliant colours. Care in the preparation and preservation of the dye-stuff exercises a most important influence over the quality, but the produce of one district is often much superior to another—a fact accountable for either by the more favourable nature of the soil or the care bestowed in cultivation. If intended for export, after having been dried as above, the florets are either placed in a bag or on a basket or other contrivance, permitting of the easy escape of a supply of water which is kept poured on them while beaten or irodden on This process is continued until the water passes through quite trodden on This process is continued until the water passes through quite trodden on This process is continued until the water passes through quite trodden or the soluble yellow colour.

is an to their valuable red dye. The

Yellow.

res the quality of hed until

-- foot as they appear, arehully The Sefferment

CAPTHANUIS tinctomic

they are quite freed from the sellow colour. River water (I clear) is real purities in the water is most determined. The red of four resistance completely soluble in dilute a'kaline solutions, and care mist be taken that the water used does not contain soluble alkaline sales in fact, to be safe it should be slightly acidulated, otherwise a large perper on of the red colour may be removed during the process of wash pr awas these" pigment. The tramping or kneading is con inued at internal for these or four days, the mass being allowed to get dry between the wast ery. To ascertain if all the sellow colour has been removed a small outrits is thrown into a bas n of clean water, if it does not impact se' in co' er, the diestuff has been sufficiently washed. The pulpy mass is remagareard between the hands into small, flat, round cakes, I kelt scuttager it is some times, though less frequently, made into balls. These are ke an in its trade as "Stringed Saffmer" When the cakes or La's have been carefully dued, they are ready for the market.

The Garetteer I to the district of Karral in the Panish describer the process penerally followed in that provin e, in which apparently the fires are baked into cakes without rem a re the se me e me "When the florets open, the women pick out the petals; three days later they recent the operations and again a third time after the same servers. If I cod they take a quarter of the picking as the number. The perals are by self the same day in a mortar, rolled between the bands, and received she's into a cake. Next day they are rolled are no artifen serration the sen for two days to day, or st 'I better one day in the sun se t to a days in the shade One seer of prials will give a quarter of a seer of dir die Are delay in the preparation injures the die. The process is a serie dele. tive from that pursued in Beng thand other parte of le attat at man te accepted as accounting for the lower poce of the cell of the these week Mr. J. G. French, writing of Da ca dierra in Bernal in the Acres

Horticultural So sety & Journal fr 15 , remarks "5" art 11 12 I this close I smeth or was as I strees reverse a the reste . Distributed been a meeting of which is a function to encourage of the state of their valuable properties being under some of their their their way many assessment be relief to the their their many assessment between the following of their their would be remained to the following of their malen de rue anti ema caretes rardas de me m, erar e e re-In no dequest nettlemen ettleg at Ther ge quest of legists to the construction of the service production for the service when we the construction of

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### CARTHAMUS tinctorius.

### The Safflower.

DYE.
Estimation of Quality,
661

The quality of safflower cake is estimated by desing a known weight of cotton; about 4 ounces of safflower will doe ilb of cotton cloth light pink; 8 ounces will doe it full rose-pink; and from 12 ounces to ilb will doe it a full crimson. In order to take up this quantity, the cotton must be several times dyed in fresh solutions of the colouring matter.

Two yellows

Chemical History.—It is scarcely necessary to go into great detail regarding this, nowalmost unimportant, product. It has already been stated that the florets contain two colouring principles, or, to be more correct,

il, the lorth-26 to c usual

Carthamin.

36 per cent. of the florers, while from 0'3 to 0'6 per cent. is the usual amount of Carthamin. The proportion of Carthamin present varies, however, in the inverse ratio to the amount of the soluble yellow principle. The second yellow colour is soluble only in an alkaline liquor.

If the dye-stuff, after the removal of the soluble yellow principle, be acidulated with acetic acid, filtered, and first acetate of lead and next

solubility in pure or acidulated water. I he alkali in most irrequent use is carbonate of soda (or ordinary washing soda, 15 per cent. to the weight of the florets). In India pearl-ash is most frequently used, especially that prepared by incinerating bayra (Peniciliana spicata) or of chir chirat (Achyranthes aspera), (impure potassium carbonates), but the natural earth carbonate of soda or saff-mátí is also frequently employed for this purpose.

EUROPEAN DYE SOLUTIONS.

#### EUROPEAN DYR SOLUTIONS.

Preparation of Dye Solution and European Methods of Dyeing with

the cathraine acte from these loneign substances, but this tesus is very readily brought about by immersing into the alkaline solutions, previous to the addition of an acid, a quantity of cotton-wool. This material attracts, by special action, the carthamic acid at the moment it is set free by the addition of an acid; and cotton-wool may first be washed in a weak acid, and next in water, and, lastly, again with a weak alkaline liquid, which re-dissolves the carthainin. After removal of the cotton-wool, plenty of which should be used, it is re-precipitated by an acid, very dilute carrie or tartatte being the best. It falls down in the state of a country of the cotton washed, and dired. In order to obtain a still purer material, the floccularity of the contraction of the cotton washed, and dired. In order to obtain a still purer material, the floccularity is and the

Care shoul

pletely alters the colouring matter.

The Safflower.

CARTHAMUS tinctorius.

"Carthamin in a pasty state, as obtained by the process just described, is met with in commerce suspended in water for direct use. The paste is dired upon suitable vessels—porcelain saucers, plates, or even upon polished cardboard

DYE.

acid, this, while of course not so decutate as that given above, is nevertheless the mode pursued where absolute purity is not necessary. The following passage may prove useful to Indian dyers or persons interested in the safflower industry: "Carthamus from which the yellow matter has been extracted, and whose lumps have been broken down, is put into a trough. It is repeatedly sprinkled with crude pearl-ash or soda, well power than the pearl-ash or soda, well pearl-ash

long as it is perceived to take up the colour For fonceau (poppy-colour) it is withdrawn, the liquor is run out of it upon the peg, and it is turned through a new bath, where it is treated as in the first. After this it is dried and passed through fresh baths, continuing to wash and dry it between each operation, till it has acquired the depth of colour that is desired When it has reached the proper point, a brightening is given it by turning round the sticks seven or eight times in a bath of hot water, to which about half a pint of lemon-juec for each pailful of water has been added

"When silk is to be dyed ponceau or poppy-colour, it must be previously boiled as for white, it must then receive a slight foundation of arnatio. The silk should not be alumed. The nacarate and the deep cherry-colour are given precisely, like the ponceaux, only they receive no arnatio ground, and baths may be employed which have served for the ponceau, so as to complete their exhibition. First baths are not made

for the latter colours, unless there be no occasion for the poppy,
"With regard to the lighter cherry reds, rose-colour of all shades,
and flesh colours, they are made with the second and last runnings of the
carthamus, which are weaker. The deepest shades are passed through
first

"The lightest of all these shades, which is an extremely delicate fleshcolour, requires a little soap to be put into the bath. This soap lightens
the colour, and prevents it from taking too speedily and becoming
uneven. The silk is then washed, and a little brightening is given it in
a bath which has served for the deeper colours.

"All these baths are employed the moment they are made, or as speedily as possible, because they lose much of their colour upon keeping, by which they are even entirely destroyed at the end of a certain time. They are, moreover, used cold, to prevent the colour from being injured. It

### CARTHAMUS tinctorius.

### The Safflower,

DEY.

must have been remarked, in the experiments just described, that caustic alkalis attack the extremely delicate colour of carthamus, making it pass to Jellon. This is the reason why crystals of soda are preferred to other alkaline matters.

"In order to diminish the expense of carthamus, it is the practice in preparing the deeper shades to mingle with the first and the second bath about one-fifth of the bath of archil" (Ure's Diet of Arts, Man , and Mines, Vol. I, 661)

#### INDIAN DYE SOLUTIONS. 664

## INDIAN DAY SOLUTIONS.

Indian Method of dyeing with Safflower .-- As already stated, the method adopted in India is in theory identical with the European, but as procused it is crude, giving much inferior results when compared with the delicate shades prepared in Europe from this die. The separation of the carthamic acid from mechanical impurities by precipitating it on cottonwool and again dissolving off this pure dye by means of an alkali, does not appear to be known to the natives of India. The die stuff, after the removal of the yellow colour, is rubbed up, by the hand, with the pearl-ash, and thereafter strained through a cloth. The first straining is regarded as the best, and is reserved for giving the final shade in dyeing, but the process of rubbing up with an alkaline solution and straining is repeated three or four times, until no more colour can be extracted. No mordant is required when dyeing with safflower, but it is a common practice in India. to dye the fabric first with the yellow liquid, then with the last straining of carthamin, and so on until, when depth of colour is required, the first straining is used to give the final immersion. Before the fabric is dipped in the carthamic figuid, however, a dibite acid is added in order to precipitate the red carthamic acid. This fine powder remains for a considerable time minutely diffused through the liquid, instead of subsiding to the bottom. It has no actual chemical affinity for fibres, but when a fabric is dipped in the red liquid, the fine powder is rapidly precipitated within the dibric, producing the well known and brilliant shades of ortinge, pink, and even dark red. The acid used is generally line-juice in the proportion of about 1b of lime-juice to 2b of dye solution. Sometimes the juice of the tamarind is employed in place of time-juice. In Manipur the fruits of Garcinia pedunculata are viewed as superior to lime juice, and have the reputation of rendering the colour less fleeting

Combinations. 665

Indian Dye Combinations .- Different depths of red colour are generally obtained either by longer immersion in the dye solution or by frequent repetitions in fresh solutions. Shades of orange are generally produced either by dyeing the fabric first with the yellow soluble colour lin some parts of Bengal known as peworree water, according to McCann, a name which, if actually applied, must be carefully distinguished from the yellow urine dye or provi or pers rung) Instead of the sufflower yellow, a ground colour may be given with turmers or any other yellow dye, when different shades of orange or narangs will be obtained, so also combinations with arnatto, kamala, and harsinghar, the shides of orange passing into pink. Red is produced by three immersions in safflower dye, the 3rd straining, 2nd straining, and last of all the 1st straining, the cloth being allowed to dry between each, and finally washed out with turmeric This is known in Farukhabad as gulanar, if instead of turmeric indigo be used, a magenta colour is produced, the gulabbasi of Agra The sappar pink of Campore is produced with harringhar and safflower, the latter being weak if concentrated, orange or the narangi of Etawah is the result, and a more yellow orange, safrám, is produced, when the cloth is first dyed with harsinghar and afterwards with safflower. (Buck's Dyes and Tans of

The Safflower.

CARTHAMUS tinctorius.

N.W P) With Terminalia Chebula or T. citrina and protosulphate of iron, safflower gives a dark neutral tint, with safflower, sappanwood, and alum a purplish brown; and with indigo and safflower, greens and purples (McCann, Dyes and Tans of Beng)

DYE.

An almost indefinite series of colours are obtained in India by various Use of acids combinations with safflower. It should be carefully observed, however, and alkalis.

peconitrity be tuny appreciated, otherwise the observer cannot give an f

FIXING

ent parts of India boast of possessing a secret of effecting this purpose, and careful observation on the part of local officers may help to throw some light on the subject. All that is necessary to re establish the carthamine dye as an important industry is the discovery of some mode of preventing this oxidisation of carthamin. The fruit of Garcinia pedunculata, a common tree in Assam, has already been alluded to Although there would not appear to be much hope of finding the property attributed to this fruit confirmed on careful examination, its extensive use as a dye auxiliary by most of the hill tribes of Assamcertualy justifies this matter receiving careful attention Dr. McCann informs us that the dyers of Chittagong district claim to be able to produce a "semi-perma-This is done by adding safflower to water in which nent" safflower dye tamarinds and the ashes of burnt plantain rinds have been well soaked The principle here employed is the mixing of the acid and alkali together, instead of first extracting the dye with an alkali and precipitating the carthamin with an acid upon the fabric. In some parts of India the pearlash and lime-juice are mixed together, and the liquid thus prepared is used to extract the carthamic acid direct. It is difficult to understand this

Safflower dyed fabrics should not be washed with soap, as the colour is removed by the alkali of the soap

Rouge.-It is necessary to refer here very briefly to an important purpose for which safflower is employed, viz, the manufacture of rouge ROUGE.

C. 66a

#### 194 CARTHAMUS The Safflower. tinctorius. DYE. vegetale. This trade is unaffected by the amline imitations of safflower, and constitutes an article of considerable importance. The dry carthamine precipitate is sometimes called India or China lake, and this mixed with finely-pulverised talc constitutes rouge végétale. (See Carmine; also Carnelian—the coloration of inferior gems.) OIL. THE OIL 670 There are two kinds of seeds, or, to be more accurate, of fruits-one the cultivated, a white and glossy forsimilarly-shaped seed, mottled or di yield oil. As already explained, an Bombay in fact and yellow; it ig in lamps, on II). It is used gredient of the " Macassar Hair-oil " In the Gasetteer for Karnal st is stated that the oil is arks essfor lamps." The average yield of oil is said to be about 25 per cent. "In Bulandshahr the safflower yields about 7 maunds of seed per local bigha. The oil-cake is supposed to be the perquisite of the oil-presser Prices. in lieu of wages. A maund of seed yields 7 seers of oil, 14 seers of oil-cake, and 19 seers of husk or bhush, and the oil sells at from 4 to 5 seers for the rupee, the cake at 36 seers, and the bhusa at 4 maunds" (E. T. Atkinson) ~~ - sale. Though it lowers the quality of th increased by mixing its seeds with Although the oil is apparently not ginge trade is done with Liverpool and expor London in the seeds. Expression of Oil .- "The oil is expressed in the same manner as the EXPRESSION other oil-seeds. After " Dry cold 671 are thick and would we they are removed, 25 p able oil, which is of a that it has not been brought more into use for English lamps. I use scarcely any other oil." Dry Hot extraction of Oil .- "There is also another way of extracting Dry Hot. the oil, which is, I think, so peculiar that I will attempt to describe it. It 672 but this eli-ropes. exposure

Process of xtracting the Dry Hot

e three is luted with clay, and on of the vessels,al. Dried

ug in the

fire. The fire is kept in ignition for about hair an hour, when it is temoved.

C. 672

The Safflower.

ARTHAMÜŚ tinctorius.

upper inverted vessel is found to be about half full of the charred seed and the lower one, which was imbedded in the ground, about one-third full of a black str charred, but the n servation of leathe worth the while c this kind of oil wor. oil by this proce . (R. W. Bingham,

OIL.

THE MEDICINE

MEDICINE.

"This plant is the kusumbhu of Sanskrit writers, who describe the seeds as purgative, and mention a medicated oil which is prepared 673

hixed oil is prepared from it which the lytians used as an external. ' 1d ulcers: . for which at into an m of the a. I., 72). .ccoprotic. Jamaica, the flowers are much used for colouring broths and ragouts.

Flowers. 674

resemble in colour, but from which they may be distinguished by their tubular form, and the yellowish style and filaments which they enclose. In large doses carthamus is said to be laxative; and administered in warm infusion, diaphoretic. It is used in domestic practice as a substitute for saffron in measles, scarlatina, and other exanthematous diseases to promote the eruption. An infusion, made in the proportion of two drachms to a pint of boiling water, is usually employed, and given without restriction as to quantity " (U. S. Dispens)

677

" The seeds are said to have properties like inseed, and to be useful i

Decection. 678

in unhealthy ulcers" (U. C. Dutt, Civil Medical Officer, Serampore). "Decoction used as a diuretic. The seeds are lavative. The oil is used

FOOD.

. "The used as an article of food. The roasted seeds are eaten; they were much pro-

679

cured by well-to-do people during the late famine at Sholapur. The cake is excellent for fattening poultry" (Lisboa, Us. Pl., Bomb., 163). Safflower is sometimes used to dye cakes, biscuits, and toys, but as it is purgative it should not be too freely employed for this purpose.

Capital Dalaina

· leaves

The Caraway.	Carui.
oriental origin since such a name might simply mean that in that part of the country it was first brought to the attention of the natives by the Europens Indeed, the facilities of trade offered by the Persain Gulf can easily be understood to have made the people of Bombay more familiar with an imported article than with a wild or event cultivated plant of the Panjáb Himálaya. Authors are about equally divided in the restriction of the word einst of Carimu Carul on the one hand, and to Cuminum Cyminum on the other (Conf. with C. nigrum)	CONDIMENT.
Great Britain are about 20,000 cwts a year and chiefly from Holland It is also largely grown in Kent and Essex.	trade. 683
Oil —A valuable essential oil is obtained from the seeds, called Caraway Oil. This oil is colourless or pale yellow, thin, with a strong odour and flavour of the fruit It is used in medicine and more extensively as a perfume for scops. (Spons')	684
The stranger of the factor and a second street of the	PERFUMERY. 685
Medicine.—As a medicine the dried fruit possesses stimulant and carminative properties. It has been found useful in flatulent colic, atonic dyspepsia, and spasmodic affections of the bowels. Two preparations are given in the <i>Pharmacopana of India</i> , vis., Oil of Caraway and Caraway.	686
water "Muhammadan writers describe the fruits as aromatic, carminative, and astringent, from them they prepare an eye-ash which is supposed to strengthen the sight, they are also used as a pectoral, and considered diuretic and anthelminite. A caraway bath is recommended for painful swelling of the womb, and a poultice for painful and protruding piles" (Dymock's Mat Med. W. Ind., 20,1).	Fruit 687
Chemical Composition.—"Caraways contain a volatile oil, which the Dutch drug affords to the extent of 5 5 per cent, that grown in Germany to the amount of 7 per cent; in Norway 5 5 per cent have also been obtained from the indigenous caraways. The position and size of the vita account for the fact that commination of the fruits previous to distillation does not increase the yield of oil "Volcke! (1849) showed that the oil is a mixture of a hydrocarbon Ciolly and an oxygenated oil, CigH1,0 Berzelius subsequently termed the former carrent and the latter carrel	688
and has t	

mas to grant power, that or carreine being considerably the stronger; there are probably not many liquids exhibiting a stronger dextrogyrate rotation. Carvene is of a weaker odour than carvol, from which it has not yet been absolutely deprived, perfectly pure carvene would no doubt prove no longer to possess the specific odour of the drug By distilling it over sodium, it acquires a rather pleasant odour, its specific gravity at 15° C.

is equal to o 861.

C. 688

CARUM copticum.	The Bishop's Weed.
CHEMISTRY	"Carvol at 20° C' same oil appears to percental constitut  "I four parts of Carvol, eith unved with one part of alcohe sulphuretted hydrogen, crysta added. (Pharmacog)
	Special Opinions - 5 "Stimulant and Inxitive. The white variety lactagogue" (Assistant Surgeon Nehal Singh, Saharanpore) "Hay

FOOD Seed 689 Roots 690 D Picacly, Purneals)
Food—The seed is used parched and powdered, or raw and entire
In the former case it is employed to flavour curnes, in the latter it is put in
cakes—It is used in confectionery and in flavouring drinks—It also "produces a spirit cordial" (Morton)—The roots of the caraway plant are very
agreeable, and are much eaten in the north of Europe (O Shaughness)

Special Opinions — 5 "As a condiment with curries" (Surgeon C M Russell, MD, Sarun) "Carminative, largely used in curry powder" (Assistant Surgeon Shib Chunder Bhatlacharji, Chanda, Central Provinces).

used it to increase the flow of milk with no decided effect" (Surgeon

691

Carum copticum, Benth, Fl Br. Ind, II, 682, Wight, Ic, 1 566.
The Bishof's Wred, Lovage, Ajava Seeds, Amyaad,
Dutch, Sison, Fr., Ameso, Port.

Syn - Ammi copticum, Boiss , Ligusticum Ajanain, Fleming, L Ajouan, Robb, Prychotis Coptica, DC P Ajowan, DC Sison Ammi, Jacq , Bunium Aromaticum, Limi

Vern - Ajonan, ajwain, Hibb Jowan' juvani, Beng, Ajamo, Guj, Chohara Cutch, Owa, Mar, Sawind, Kashmir, Aman, oman,

Re

161, 223 Spons Encycl, 791, Smith, Ditt, 1, 110, 4, 5, Top Ajmir, 124, Kem Cat, 74

Habitat — Cultivated extensively in India on account of its seeds, from the Panjab and Bengal to the South Decean. This seems to be the equit of the Greeks. It is first mentioned in Europe as brought from Egypt about 1549 and had come into medical use in London about 1693, since it is mentioned by Dale.

Oil - The seeds yield an oil on distillation with water, which is used

ds are much valued for their inative properties. "They are y of capsicum or mustard with assmodic virtues of asafœuda"

602 CEDICINE 693

CARIIN nicrum.

### Black Caraway.

CHEMISTRY

"The mol is more conceniently and completely extracted from the oil

by shaking it repeatedly with caustic be, and neutraliang the latter,

"The ail of ajuria, from which the thy mol has been removed, bads at about 172", and contains expinene (or expios) Colly, which, with corcentrated sulphuric acid, affords cymen sulphonic acid, Call, SO,Oll. The latter is not very readily crystallicable, but forms crystallized calls with baryum, calcium, zine, and lead, which are abundantly soluble in water. In the oil of aim ain no constituent of the formula Cally appears to be present; mixed with alcohol and nitric soid, it at least produces no ers stale of ternin

"The residual portions of the oil, from which the symene has been distilled, contains another substance of the phenol class different from themol "

Special Opinions -4 Sometimes used by the natives for colds; useless as fix as my experience goes (Surgron-Vajor C J. McKo na, Carenfore). "Much used in fixulence, dirirhue, and with other drugs in dispepsia Very useful in flatulence and with dispepsia, especially administered in powder mixed with other antispasmodes." (Surgeon G. Price, Shinabad). "Exported to England for the sake of the thismoil it contains, and which is used in surgery as an antiseptic. Native doctors in Madras famine relief camp used to give 'omum water' for dysentery. I don't think it was of any use, nor, for the matter of that, was any other drug, but they and their pat ents had great fath in it (6 B Mafras). A Aromatic, stimulini, antispiramodic, tonic, sullarogue, such in dyspersia, comung, gruping, diarrhere, flatulence, funtness (Hospital Assistant Chooma Lall, Jubbulpore) with blick pepper and sait, and

lence and colic and promotes dige

der Bhattacharje, Chanda, Centra the seeds is very useful as a carminative, and is largely used by the natives, being administered to newly-born infants as a carminative and stimulant. This plant is commonly cultivated in this district, being largely used as a condiment" (Surgeon S II Browne, II D, Hothang thad, Central Provinces) "The seeds form a constant ingredient in all native mixtures for theumatism. In combination with cardamoms and nutmegs in powder, and mixed with the mother's milk, they are commonly given to newly born children '(Narain Misser, Hoshangabad, Central Provinces) "A very good carminative" (Honorary Surgeon E A Morris, "Stimulant, anti scorbutic, heating medicine" (Surgeon Negapatam)

W A Barren, Belgaum, Bombay) Food .- The seeds are aromatic, and form an ingredient of the prepa-

ration known as ban

Carum nigrum,? Royle, Him. Bot, 229.

BLACK CARAWAY

Syn -Stewart, Baden Powell, &c , refer the name CARUM GRACILE, Bth , to this species or rather place both under C CARUI " K , Shimat-shiragam, pilappu Trarn - Sh h aleah

L; Shima jerakum, MALAY; ARAB ; Zirahe siyah, sirahe

Sheriff, Supp Pharm Ind oo Dymock, Mat Med W Ind , 305, S. Arjun, Bomb Drugs, 63, Birdaood, Bomb Drugs, 39

Habitat -- Royle mentions that seeds under the name of Zeera seeah are imported from Kunawar, and that these are "a kind of caraway" To

FOOD 6g6 607

			, me Economic	
CARYOPH aroma		CI	07es.	~
	Hs	1	· · · · throughout Inc	ha
nedicine. 702	:	٠.	vomiting, and stimul	
FOOD. Seeds. 703 Leaves. 704	Shib Chunder Food.—Of which is used stitute for pa Leaves though	ten raised in garder in flavouring curry, irsley (Royle) Exte	l ingredien islant Surgi la, Central Provinces, is during the cold season for the si also used by the Europeans as a seasively cultivated in Gajarat (Lisbe smell are now and then used by I (Vorgt).	eed ub-
705		icy work, Image	s, &c	
	Berberis negal ful for inlay: Buxus sempery Cedrela Toon Celastrus spind and engravi thickrassia tia (carving) Cocos nucifera, Cratteva religa Cupcessus foru Dalbergia cultr D. latticolia, f. fancy work). D. Sissoo, Ros Diospyros Ebb for inlaying). D. melanoxylor and carving) Eaboymus gran into, spoons). Givota rottlerii ing figures).	ng) trens, Linn, (carving) a, Roth. (carving) a, Roth. (carving) as, Roth. (carving) bularis, Adr. Juss Linn. (laney work) osa, Forst. (models) losa, Don. (images) losa, Don. (images) losa, Don. (carving) losa, Carving and th. (carving and th. (carving work) denum, Konig. (used a, Roth. (laney work) difforus, Wall. (carving, wall. (carving, formis, Griff. (carving,	mental work).  Holarrhena antidysenterica, IVa (carvings).  Kydia calycina, Rozb (carving).  Media Azadurachta, Liniu. (idols).  Pistacia integerima, T. L. Steua (carving) ornamental work)  Premna tomentosa, Willd. (fan work)  Santalum album, Liniu. (carving).  Stephegyne parvifolia, Korth. (car ed articles).  Symplocoa cratægoides, Ham (car vingla).  Wighta tinctoria, R. Br. (carving W. tomentosa, Rom. & Sch. (carve work).	13- 21. 21. 27. 2. 2. 2. 2. 2. 2. 3. 3.
706		•	Linn.; Gen Pl., I., 719.	
700	Caryophyllus		.; DC. Prode, III., 262; [Myrtace2	٠.

CLOYES

Syn.—Fickwis Carvornyllata, Thunberg.
Vern.—Richar Pern; Laranga, langa, Brvo; Láng, lung, Rivo;
Lunct, larandal, Pa; Raung, Kasimus, Lavanga, laung, Rivo;
Lavanga, boun, Arrandor, liendes, disemplopes, kennely pai
toty, Laranga, boun, Arrandor, liendes, disemplopes, kennely pai
Laranga, bvn; Larandorn, liendes, disemplopes, kennely pai
Laranga, bvn; Larandorn, Log, Charle, Mala, Lahang, Dec.;
Laranga, bvn; Larandorn, C. B., and Laranga, Dec.;
Laranga, bvn; Larandorn, L. B., and Laranga, P. Durm, L.
Referenceta.—Savé, F. I. Ind., Fd. C. B., and Kurs, For F. Durm, I.
Lai, St., F. Wa, C. Hand, P. Marmaco, You, U. S. Dirbers, 19th
1-3, 31, Lange of Trim, Med. Fl., 112, Annilus, Mal., Ind., Ind.

Cloves.

CARYOPHYLLUS aromaticus.

503, U C Dutt, Mat Med Hind, 164, 307; Dymock, Mat Med W Ind, 2nd Ed, 323, O'Shaughnessy, Beng Dispens, 334, Murray, Pl and Drugs of Sind, 192, Baden Porell, Ps Pr., 390, Warne, Baser Med, 44, S Arjun, Bomb Drugs, 56, Birdwood, Bomb Pr., 35, Lisbody U Pl of B.
34, Spans, Encyclop, 1807
Treasury of Bolany, Amir

Habitat -A native of the Molu

The Dutch tried to restrict its cultivation to the Island of Amboyna, but in the course of time it got introduced into India and other tropical countries The flower-buds of this plant yield the cloves of commerce

Cultivation and yield —"In cultivating cloves, the mother-cloves (fruits) CULTIVATION.

in the 12th year, when the average annual produce may be estimated at 6-7lb of marketable fruit from each tree. There is usually a crop every There is usually a crop every year, but in Sumatra the trees often bear only twice in 3 years When past its prime, the tree has a ragged appearance. Its existence in Sumatra is supposed to be limited to a duration of about 20 years, except in very superior soil, when the manhan laste and not bear till the

Hence, 1 old trees have att to throughout it very desirable

The harvesting of the flower buds (cloves) commences immediately they assume a bright red colour. The best and most usual plan is to pluck them singly he hand me able stages for taking the operation in the case of the

however, they are beaten off by long spread below. The plucked cloves und

confers a brown hue, and prepares them for packing In Sumatra, simple exposure to the sun for several days on mats is the common method, but elsewhere they are occasionally also smoked on hurdles covered with matting near a slow wood fire, and very rarely they are scalded in hot water before smoking. They are ready for packing when they break

easily betwen the fingers" (Spons' Encycl)

Oil -- Every part of the plant abounds with aromatic oil The flowerbuds and flower-stalks of cloves yield, when distilled with water, an essen tial oil The process of distillation is largely carried on in England is a colourless or a yellowish oil, having a powerful odour and flavour of cloves It easily combines with grease, soap, and spirit, and is extensively made use of in the manufacture of perfumery In Germany it is often adulterated with carbolic acid The essence of cloves is obtained by dissolving oil of cloves in the proportion of four ounces of oil to one gallon of spirit

Description of the Drug -"The varieties of cloves occurring in com merce do not exhibit any structural differences Inferior kinds are distinguished by being less plump, less bright in tint, and less rich in essential oil In London price-currents, cloves are enumerated in the order of value thus: Penang, Bencoolen, Amboyna, Zanzibar" (Pharmacog, 284). The cloves met with in the Indian bazars are generally old and worthless. Those suited for medical use should have a strong, fragrant odour, a bitter, 707

## CARYOPHYLLUS aromaticus.

### Cloves.

PESCRIPTION OF FHT DRUG spire, pringent trate, and a cold emit a trace of . I when pressed with the nail (Waring a Basin M commerce an important of the commerce and interest of the commerce and interest of the commerce of t

MEDICINE. Buds 708

me - tred flower-buds which constitute the cloves of com *1 they are used in atonic of pregnancy me drichm of n in the dose bruiscu v o of from It to Jus, thrice um; . psia A five grun pill made of equal parts of jainp and pondered coves generally opens the bowels 'Closes are much used in Hindu medicine, as an They are regarded as light, cooling, stomachic and aromatic adjunct An infusion digestive, and useful Hand, 164) of cloves is given to retta has an A mixture of equal , excellent effect in debility, loss of appetite, and in convalescence after ma-tela, is used externally in rheumatic pains, . . I frequent ingredient of headach pill mas consider applied externally, and perluming the brea tonic, and digestive qualities They have a tu effect that one male clove eaten daily will prevent conception (by in-Mat Med W Ind , 329) Chemical Composition -"Few plants possess any organ so rich in essential oil as the drug under consideration. The oil known in pharmacy as Oleum Caryophylli, which is the important constituent of closes, is obtainable to the extent of 16 to 20 per cent. But to extract the whole the distillation same material r and "The oil . מסג on closes, sp gr 10th tu 100 alled Eugenol, in variable p or loves, and comes over in the first period tion C15 H26 a sp gr of o 918, and boils

at 251°C It devis of polarization slightly to the left, and is not coloured on addition of ferric chloride, it is of a rather terebinthina seems odour

ed on addition of an acid and again distituing caugenol is devoid of rotatory power, whence the crude oil of cloves, of which eugenol is by far the prevailing constituent, is optically almost mactive. The constitution

of eugenol is given by the formula C, H, OH OH (CH CH CH)

Cloves.

### CARVOPHYLLUS aromaticus.

to the phenol class, and has also been met with in the fruits of Panenta officinalis, in the Bay leaves, in Canella bark, in the leaves and flower-buds of Cinnamomum zeylanicum, and in Brazilian clove bark (Dicynellium carvonhyllatum, Nees)

"Eugenol can be converted into Vanillin.

"The water distilled from cloves is stated to contain, in addition to the essential oil, another body, Eugenin, which sometimes separates after a while in the form of tasteless, crystalline laming, having the same composition as eugenol. We have never met with it

"According to Scheuch (1863), oil of cloves also (sometimes) contains a little Salicylic acid, C, H, COOH }, which may be removed by shaking

the oil with a solution of carbonate of ammonium

Caryophyllin, Con H32 O, is a neutral, tasteless, inodorous substance, crystallizing in needle shaped prisms We have obtained it in small quantity, by treating with boiling ether cloves, which we had previously deprived of most of their essential oil by small quantities of alcohol Mylius (1873) obtained from it, by nitric acid, crystals of Caryophyllinic Acid, C. H. O.

"Carmufellic Acid, obtained in colourless cry stals, C., H. O., in 1851, by Muspratt and Dansan after digesting an aqueous extract of cloves with nitric acid, is a product of this treatment and not a natural consti-

tuent of cloves

"Cloves contain a considerable proportion of gum; also a tannic acid

not vet particularly examined" (Pharmacog, 285).

Special Opinions .- § "Cloves relieve tickling cough when kept in the They are stimulant" (Surgeon-Major W Moir, Meerut). "Mixture formed by rubbing cloves with honey on a copper plate, is applied by means of a feather to the conjunctiva of the lower eyelid in cases of conjunctivitis Oil extracted from cloves is useful in toothache" (Surgeon Anund Chunder Mukern, Noakhally) "Clove stalks (vikuria) are also imported for shipment to Europe, where they are distilled India is

id mother-cloves (nar laung)" said to be stimulant and car-

·nna, Caunpore) "Useful in

a lamp, &c, then taken they is cough" (Brigade Surgeon

G H Thors for (Assistant 5 truces)

used in the Cochin)

Lead, Salacaty Food .- The dried flowers (cloves) are used to a limited extent as a hot spice throughout India They are also chewed in pan.

Foreign Trade in Cloves

Year.			luro	RTS.	EXPORTS AND RE EXPORTS				
					- 1	Quantity	Value	Quantity	Value.
18%-81		_				2,5%3,852	R 14,49,739	1,064 115	R 6,20,331
1551-52						2,653,536	12,64,254	735,892	3.42 572
1°S2 °3					٠,	3 975,232	13 09,518	1,230,104	3 74 857
SS3-S4		•			• ]	3 803,150	10,61,206	1,068,906	2,75,554
1551-55	•	•	٠	•	•	4,791,006	11,09,541	1, 49,040	3 67.249

MEDICINE.

FOOD. 709 TRADE. 710

### CARYOTA Urens.

# TRADE.

## Sago Palm.

## Imports for 1884 85

Presidency to which imported		Quantity	Value	Country from whi	ch	Quantity	Value.
Bombsy Bengal Bertsh Burma Madras	•	h 4,598,419 190,526 1,288 773	R 10,50,680 58,283 425 453	Zanzibar . Aden Other Countries	:	B 4,776,842 11,767 2,397	R 11,05,877 2,908 1,036
TOTAL	·	4,791,006	11,09,841	TOTAL		4,791,006	11,09 841
			Exports f	or 1884 85	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		

Presidency from which exported.	Quantity	Value	Country to which exported,	Quantity.	Value.
Bombay Bengal .	Ib 1,618,465 29,165	R 3,55,692 10,000	United Kingdom China—Hongkong	ib 1,112,224 349,698	R 2,32 739 84 966
Madras Sind	1,390 20	1,462 5	Straits Turkey in Asia Aden France Other Countries	124,101 15,137 7,000 7,000 33 880	33,543 3,887 1,790 2,750 8,574
TOTAL	1,649,040	3,67,249	TOTAL .	1,649,040	3,67,249

Very little can be said regarding the present position of the new industry of cultivating cloves in South India Good samples were, howeyer, shown at the Colonyal and Indian Exhibition

# CARYOPTERIS, Bunge; Gen. Pl., II., 1157.

Caryopteris Wallichiana, Schauer; DC. Prodr, XI, 625; [VERBENACEE.

Vern -Mont, mohdni, Kungon; Shechin, Nepal; Malet, Lepcha.

References.—Brandis, For Fl., 370, Gamble, Nan Timb. 200 Habitat — A large shrub with thin, grey, papery bark, pecling off in vertical strips, met with on the outer Himalaya, from the Indus to

Bhutan, ascending to 3 000 feet
Structure of the Wood -Dark grey, moderately hard, with the scent
of cherry-wood.

# CARYOTA, Linn, ; Gen. Pl , III, 918

CARYOTA URENS 711 Caryota urens, Linn; Gamble, Man. Timb., 420; Palme.

KNOWN IN BOMBAY AS THE HILL PALM; also "SAGO PALM"
Vern.—Han, Hino, Rungbong, simong, Lepcha; Bara flamar, Ass,
Salega, Uniya, Stari ki jhir, Dec; Bherama, berli, bhirli mahad, berli

Sago Palm.

CARYOTA

med, therle meda, ber mhar, Bou, ; Shiwajate mardi, mari, jirkeu, y utalifanna, kén tal-fa Shunda fana, Mali, minlaw, kimbo, Bunu.

References.—Rest, Fl. Ind., Ed. C.B.C., US; Brandis, For. Fl., 550; Kurs, For. Fl. Burm, Il., 521 Vogt, Hort. Sub. Cal., 637; Thrantes,

Habitat.—A beautiful pulm, with smooth, annulated stem, met with in the forests of the western and eastern moist zones. On the Western flats, it extends to near Mahableshwar. In the Settlement Reports of the Chanda district it is stated that this pulm abounds in the south-

FIBRE.

is made into ropes, brushes, brooms, byskets, and other articles; the fibre from the sheathing petiole is made into ropes and fishing-lines" (Gamble), and is said to be suitable for paper manufacture.

and also the similar cord-like fibres the cocoanut and palmyra palms. It ese were to be sewn in bands into the

was suggested that if either of these were to be sewn in bands into the fabric of the corset the desired object would be obtained. The idea met samt

Samt conti refer trade however, he returned with the report that while the *kitful* fibre was per-

haps preferable for the brush-maker, the softer nature of the salopa fibre of India made it preferable for his purpose. These facts are alluded to in the hope of awakening interest in an Indian fibre that has been much neglected. For a good few years past Ceylon has done a by no means

tage enter into competition with Ceylon. The kittul, or as it is called in Orissa the salopa fibre, is the cord-like fibro-vascular bundles which surfound the base of the leaf sheath. Mr. A. Robottom was the first to

CARYOTA urens.

Sago Palm

as good as any he had ever seen from Ceylon, and seemed confident a large trade could be done in the Indian fibre

Tomentum stem fibres It is commonly reported that in Ceylon the black fibre from the leaf-stalks is manufactured into ropes which are of great strength and durability, being used for tying wild elephants. A woolly material found at the base of the leaves is sometimes used for caulking ships in Burma, in some parts of India the cord-like fibre from the stem of this and other palms is employed as a bow-string or as a fishing line [see B. 657]

MEDICINE, 713 (Royle, Fib Pl.)

Medicine,—"An excellent spirit is obtained by the fermentation and distillation of the toddy obtained from this elegant palm, which is not un common on the west coast of the Madras pennisula. It is well adapted for pharmaceutical purposes," A glass of the freshly drawn toddy, taken early in the morning, acts as a laxative." (Pharm of India)

F00D. 714 Food.—Roxburgh writes: "This tree is highly valuable to the natives of the countries where it grows in plenty. It yields them, during the hot season, an immense quantity of toddy or palm wine. I have been in formed that the best trees will yield at the rate of too pints in the 24 hours. The sap in some cases continues to flow for about a month. When fresh, the toddy is a pleasant drink, but it soon ferments, and when distilled becomes arrack, the girn of India. The sugar called jaggery is obtained by boiling the toddy. The pith or farinaceous part of the trink of old trees is said to be equal to the best sago, the natives make it into bread, and boil it into thick gruel, these form a great part of the diet of those people, and during the late famine (1830?), they have reason to believe this sub-

eaten the gruel, and think it fully get from the Malay countries

ring the affect.

{ri, 1114 }

"The trees are tapped when they are from fifteen to twenty-five years old Besides bruising and binding it, the spathe, which is cilled bole, is heated to make the juice flow. Every three or four days a white cotion ysubstance called kaph, which forms in the tentie of the spathe, is removed. The stem of the tree is so soft that notches cannot be cut, and the tapper climbs by the help of branches tied to the trunk. Tapping goes on for eight months in the year. It is stopped during the rainy season June to October), because the tree becomes stippery and the spathe cannot be heated. The trees are not allowed to rest, but are tapped intit they are exhausted. In good ground they last for ten years, and in poor soil for four or five. After this they are uselss. In yield, or in the value of the juice, the big trunked palm differs little from the palmyrs. Since 1870, when the tree trax was raised from its 6d to 6i (annatz 1st Rs), the number of trees tapped has greatly fallen." (Bomb Gas (Kolaba), M. 1, 9 30)

715

Structure of the Wood —The outer part of the stem is hard and durable, and the vascular bundles crowded, black, very large The wood is strong and durable, it is used for agricultural purposes, water conduits, and buckets. It is "useff for building purpo es' (Thwaites). "Is in general use for field tools" (Bomb, Gar, AV, I, Gar, AV).

716

Cascarilla bark, the bark of Croton Eluteria, EUPHORBIACE A native of the Bahamas The bark is imported into India

	ASEARIA mentosa.
CASEARIA, Jacq., Gen Pl, I, 796	{
Casearia esculenta, Roxb, Fl Br Ind, II, 592; SANYDACEE	717
Sym —C LEVICATA, Dals, in Hooker's Jour Bot, IV, 107; C CHAM	
Dals	}
Habitat - A Configuration of the Coorg, comm to Singapore	•
Medicine - people." (Roxb)	MEDICINE 718
Food —"The leaves are eaten in stews by the natives" (Roxb)	F00D 710
C. glomerata, Roxb, Fl Br Ind, II, 591	720
Vern — Lurjur, Sylher, Burgonli, Nepal, Sugrat, Lepcha References — Roxb, Fl Ind., Ed C.B.C., 376, Kure, 1, 530, Gamble, Man Timb, 206	
Habitat.—A shrub or (in the interior of Sikkim) a tree 20 to 30 feet in height Frequent in Bhután and on the Khásia Hills at an alutude of 3,000 feet	
Structure of the WoodYellowish white, moderately hard, rough, weighing between 45 and 48th per cubic foot. Used for building, charcoal, and occasionally for tea boxes.	TIMBER. 721
C. graveolens, Dalz, Fl Br Ind, II, 592	722
Vern — Chilla, naro, aloal, kathera, pimpri, Hind , Rari, Kol , Beri, Kharwar, Newri, Santal, Girchi, tundri, Gond , Rewat, Kurku, Moda, Mar	
References — Brandis, For Fl. 243 Gamble, Man Timb, 206, Dals & Gibs, Bomb Fl, 11, Lisboa, U Pl of Bomb, 81 and 265	
Habitat —A shrub or small tree, 20 feet in height, found in Garhwal and Kumaon, Sikkim at an altitude of 1,500 feet, Deccan Peninsula and in Burma	
ght .	TIMBER
the the	723 BOMESTIC 724
C. tomentosa, Roxb, Fl Br Ind, II, 593, Wight, Ic, t 1849.	725
Syn - C Anavinga Dals & Gibs Bomb FI, 11, C Canziala, Ham; C Ovata Rook, C Elliptica, Willd	
Vern — Chilla, chilara, bairi, bhan, Hind , Maun, Manbinus, Rose, Kou, Bert, Kilarwar, Chorcho, Santai, Munhur-dhir, Mut, Uriva, Thundis Gond Khesa, Kurku, Men, wasa, gamgudu, Tel , Lainja, massei, karei Mar	
References -Reab, Fl. Ind., Ed. C. B. C., 377, Brandss, For Fl., 243 hurs 1, 520, Gamble, Man Timb, 265, Stemart, Pb. Pl., 44, Lieboa, U. Pl. of Bomb, 81 and 272, Drury, U. Pl., 118, Thrantes, En Ceylon Pl., 19	
Habitat —A shrub or small tree, attaining a height of 25 feet, common throughout India and Cevlon	
Medicine —The bark is bitter and used as an adulterant for the (Mallotus philippinesis or) Kamela powder "The pounded fruit yields a	MEDICINE 726
P C. 726	•

210	Dictionary of the Economic
CASSIA Absus.	Senna.
medicine.	milky, acrid juice, employed to poison fish" (Brandis). The leaves are used in medicated boths, and the pulp of the fruit is a very useful diurenc (Lindley).  Special Opinion — §" Bark applied externally in dropsy" (Rev. A.
71MBER. 727	rd, rough
	Cashew-nut. See Anacardium occidentale, Linn.; Anacardiacex.
	Cassareep, and
	Cassava Bread, and Tapioca, see Manihot utilitissima, Pohl.;
	CASSIA, Linn., Gen. Pl., I., 571.
	The word Cassa is taken from the Latin and the Greek Kussia, and from this has been derived Cassa the Italian, and Cassa, the French. In the Scriptures two or three different things appear all to be rendered as Cassa. The genus is of considerable importance from a medical point of view.
728	Cassia Absus, Linn.; Fl. Br. Ind., II., 265.
	Vera.—Tashmisaj, chashminj, habes-souddn, Arab ; Chashmisak, chashum, cheshmal, Pers ; Chash, chdish, bande, Ilino, Dec.; Mulaydd-erny, harakth-nam, katikido, edikkol, Tan ; Champelattilin, Tex.; Karinekolia, Mala, Chalse, Born ; Kankut, Mar ; Chimar or chimir, chimil, edj ; Choumen, Sino ; Katekellin, bi-lefan, Sino Releteaces.—Roxb, Fl. Ind., Ed. C.B.C., 351; Gamèle, Man Timô, 136, Thoules, En Goylon Pl., 96, Stewart, Pb. Pl., 61, shichton, Cat. Pb. Pl., 51, Pharm. Ind., 78, Mooden Sheng, Supp Pharm Ind., 92, Dymack, Seng, Dispers, 35, account of Sind, 6 Druy,
)	Drugs, 45, Drury, Hsm Diet, 131 Treasury of Botany, 232.
	Habitat.—An erect annual, 1-2 feet high, having grey, bristly, viscose hairs. Found growing at the foot of the Western Himálaya, and from
- (	n ptians e Greek,
1	eir pro-
	Their the Per-
medicine. Seeds 729	sian Chashmisak According to Ibn Baitar, the Soudan seeds are the best and the largest (Dr. Dymock, Mat. Med W. Ind.) Medicine.—A preparation from the serms is applied beneath the eyelids in the treatment of ophthalmia. Dr. Stocks says that in Sind "the kernels are put into the inflamed eye made up with water." For this purferness are put into the inflamed eye made up with water, "For this purferness are put into the inflamed eye made up with water," and portion, a grain term of purulent terms of purulent terms of purulent terms of purulent terms.
	trial to this treatment, and the results were on the whole confirma- tory of its alleged efficacy. Dr. G. Smith, Superintendent of the Eve Infirmary at Madras, in his report, characterises it as a dangerous

C. 729

Alexandrian Senna of Commerce	CASSIA alata.
application in catarrhal ophthalmin and granular lids, adding that its application causes great pain. As met with in the bazárs, these seeds are of a black, shining colour, somewhit flat, of an oad or oblong form, pointed at one extremity, about one-sixth of an inch long, having a bitter taste. "Pharm. Ind.) They are very bitter, somewhat aromatic and mucilaginous, and, as such, have been found very useful in mucous disorders. An extract is prepared from them and used to purify the blood. Dr. Irvine, in his Meltena Medica of Paina, says that the recepticle of the seed possesses stimulant and duretic properties (dose grains to 1 scruple). According to some authors, a plaster, made from the seeds is a useful application to a wounds and sores, especially of the penis. Special Opinions—§ "Seeds are found efficacious in ring-worm" (Surgeno C.F. W. Meadwer, Burrains). "Cathatric, dose § to 3 drachms, used in habitual constipation, or in constipation caused by pregnancy, with confection of rose and higuorice, have flatulent coles, and bihous headache, it is containing ginger, black rock-salt, and (Hispital Assistant Abdulla, Civil Dispensary, ynominger). According to Dr. Dymock, the Bombay supply comes from Sind and Cutch, value, R4 a Surat maund of 374b.	MEDICINE, Extract. 730
Cassia acutifolia, Delile.  The Alexandrian Senna of Commerce.  Sym — C Senna, \( \beta \) Limi; C Lancolata, Nectoux, non Forsh neco W & A. C. Lentitua, Bisch, Senna acutifolia, Besta See also the remarks under C Lancolata, Forshall  Habitat.—A nature of Nubia (at Sukkot, Mahas, Dongola, Berber), of Kotdolan and Sennaar, and other parts of Africa	European Senna 731
For Indian Senna see C. angustifolia, C. Burmannii, and C. obovata.	
C. alata, Linn , Fl Br. Ind , II , 264	732
References Date & C Pharm It Mat Mic Beng Di Bomb D Beng, 11 Habitat —A small shrub, with very thick, finely downy branches, cos mopolitan in the tropics, met with in Lower Bengal, Western Peninsula, Burma, and Malacca Very probably introduced into India from the West Indies, as it does not appear to occur far away from human dwellings Tan.—"Specimens of Sunare back used in tanning in Cuttack sent as Cassia Fistula proved on examination to be Cassia aliata" (McCann's Dyes and Tans) The numerous samples of this bark, shown at the late Colonial and Indian Exhibition, were highly commended by the tanners	TAN Bark 733

C. 734

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CASSIA angustifolia

## Indian or Tinnevelly Senna.

ractor prevails also in the West Indies, Brazil, Mauritius, Java, and other tropical countries Their efficiency, especially in Herpes circinatus, is con firmed by Dr. McKenna (Madras Med Jour, Vol I, p 431), Dr Ar-thur (Indian Ann of Med Science, 1856, Vol III, p 632), and others Payourable statements as to their efficiency in this class of cases are contained in the reports of Dr G Bidie, Dr W J Van Someren, Dr L Stewart, and Dr Rean As a general rule, they appear to be more effectual in recent cases than in those of long standing The Bengal Pharmacooceia contains the following formula for an ointment of the leaves, which is described as being almost a specific in ring-worm 'Take of the fresh leaves of Cassia alata a sufficiency, bruise into a paste, and incor porate with an equal weight of simple ointment.' A more effectual mode of application however, is thoroughly to rub in, over the affected part, the bruised leaves worked into a paste with a small portion of time juice. In many cases it is productive of excellent effects. The leaves taken internally act as an aperient Mr. J. Wood reports that a tincture of the dried leaves has been found to operate in the same manner as senna, and Dr. Pulney Andey states that an extract prepared from the fresh leaves is a good substitute for extract of Colocynth It is desirable that further trials should be made with them"

Roxburgh remarks that, according to the Teinga and Tamil physicians, the leaves cure all poisonous bites as well as venereal affections, and strengthen the body The fresh leaves are often employed to cure ringworm. They are well rubbed into the parts affected, once or twice a day, and generally with great success. In Jamasca, a poultice made of the

and generally with great success. In Jamaica, a poultice made of the flowers is used by the natives in cases of ring-worm (Dr. Wright). Special Opinions —4. The goors with hur and borax made into paste

are used as a specific in ring-worm." (Assistant Surgeon T. N. Choes. Meerst). "The fireth leaves bruised forman excellent application for ring worm." (Brigade-Surgeon J. H. Thornton, B. A. M. S., 'Monghy') have used it with good effect in ring worm. "(Surgeon R. D. Murray, Burd wan)." I have pretty largely used the fresh leaves bruised on potches of ring-worm met with in this district, with great success. I did not intend to blister the part, but let the patients rub the leaves on the part for a lew minutes every day. In most cases the part became natural in about ten days, There is a tendency to relayee, but if the leaves are applied for a lew days after the apparent cure, the disease does not reappear. (Surgeon D. Bant, Farabur). "The efficacy of the leaves is increased by the addition of common salt." (Surgeon Major J. M. Zorab, Balasore). "Expectorant, tonic, and astringeth, used as a mouth wash in stomatics. (Surgeon Major J. M. Jorab, Salasore). "Medical Store-kept, Traundarium." (Used in ring worm, but its efficacy is uncertain. (Bingale-Surgeon S. M. Shirore, Moorshedabad). "Efficacious in ring worm." (Assitiant Surgeon Shat Chinder Bhutlachary, Chanda, Central Propinces). Leaves iresh cubbed on parts affected with ring-worm with great benefit." (Surgeon Major J. J. L'atton, Salem).

Cassia angustifolia, Vahl , Fl. Br Ind , II , 264

INDIAN OF THE SEVELLY SENNA

Syn.—C LANCEOLATA Roxò, W & A. and (?) Wall., but not C LANCEO-LATS, Forsk'all as in Brandis, For FI 166, C ELONGATA, Lem Lit; SENNA OFFICINALIS, Roxb, S ANGESTIFOLIA, Balka

Veto -Soud-thinds, And and Pers, Hindisana, hindisantledall, Hiso Sanna makks, chimpet, see pol Bruc, Send makks midisantle Guj, Nai Hisana, nat ki-sana kabpatis, Duk, Bakisanada, mikkicke

Tincture.

736

737

Indian or Tinnevelly Senna.

CASSIA angustifolia.

shond-makhi, Mar.; Náltu-nild-virai, nild virai, nila-vákai, Tam.; Nélatangédu, Tel.; Nila vaka, Mala.; Nelávarike, Kan.; Sana-kola, nildvari. nelá-par. Sing. i. Puve-kan-voge. Burn

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th, Dic, 375; Treasury of Bot.,232; Dymock, Mat. Med. W. Ind., 268.

Habitat.—The plant abounds in the Yemen and Hadramant in Southern Araba; it is also found on the Somali coast. According to Brandis (who gives incorrectly C. angustifolia, Vahl, as a syn. for C. lanceolata, Forsk), bits in addition is a native of Sind and of the Panjsh, and is cultivated in many parts of India. The Flora of British India says C. angustifolia many parts of India The Flora of British India says C. angustifolia whas no claim to be considered indigenous to India. C. Inaccelata, Forsk, is a native of Arabia. It seems probable that the mistake made by Dr. Brandis gave ongin to the statement (see Pharmacographia, also Bentley and Trimen, Med. Pl.) that C. angustifolia is indigenous to Sind and the Panish.

The cultivated plant, as met with in India, is the Tinnevelly Senna of commerce, and the uncultivated, the Bombay Senna or Senna Mekki or Sana-maki, Sona-maki of the East. The last mentioned is imported into India from Arabia. In Bombay it is cultivated at Poona to supply the requirements of Government Hospitals and not as an article of commerce. Stocks say it is grown in Sind

Botanic Diagnosis.—This species is closely related to the preceding but the leaflets are usually 5 8-jugate, are narrower, being oial, lanceolate, tapering from the middle towards the apex; they are longer, often nearly 2 inches long, and are either quite glabrous or furnished with

the commer-

atal farmer of commen

tst. TINNPUBLLY SENNA.—This is the leaf obtained from the plant carefully cultivated in South India and (at Poona) in Bombay. Owing to greater care in its collection, Tinnevelly senna is of better quality than

Tinnevelly.

and. Arabian, Mora, Bombay, or East Indian Srnna—As already stated, this drug is denied from the wild plant as met with in Southern Arabia, and is imported from Moka, Aden, and the other Red Sea ports to Bombay, and thence re-exported to Europe. From being collected and dried without care, this is mostly an inferior commodity, fetching in London as low a price as ½ or ½ d. a. b. It is now, however, never adulterated.

Arabian. 739

CASSIA angustifolia.

Arabian Senna.

MEDICINE. Leaves. 740

Medicine.-Senna was first made known by the Arabs in the ninth century. it is extensively employed as a simple and active purgative The Alexandrian is generally regarded as more powerful than Tinnevelly and the Arabian or Moka much inferior to either of these. The objections urged against the drug are its taste and the tendency to gripe which it manifests, combined with a somewhat irritant action These dangers are, however, greatly lessened by administering the drug in the form of an alcoholic preparation, thus very considerably removing the taste griping is greatly checked by combination with salines such as bitartrate of potash, tartrate of potash, or sulphate of magnessum, along with an aromatic, as in the preparation commonly known as "black draught" Or Sakharam Arjun says that the leaves are sometimes chewed in can, "and thus a combination of a laxative and an aromatic corrective is at the same time obtained "

Dr. Waring (Bazar Medicines) says: "The imported senna met with in the bazars is usually of very inferior quality, consisting of broken pieces of deleaves, pieces of stem, and other rubbish. That grown in India, especially in Tinnevelly, is preferable to that imported from Arabia, which is called Sana-mukhi or Mecca senna The leaves should be unbroken, clean, brittle, pale green or yellow, with a heavy smell It is a good, safe aperient, and may be given as follows Take of senna leaves one ounce, of bruised ginger and cloves, each half a drachm, boiling water, ten ounces Let it stand for one hour and strain This is a good aperient in all cases of constitution, in doses of one and a half to two ounces half this quantity, or less, is required for children, according to age 1

In a list of Economic Plants sent to the Calcutta International Exhibition a sample of this plant from Cuddapah was described as given in decoction for fevers and also to cattle

Chemical Composition -The purgative property is considerably increased by combination with bitters. This fact has been confirmed by many observers. The purgative properties are due essentially to a glu-coside acid named Cathartic Acid. This, which is almost insoluble in water or strong alcohol, is readily soluble in ether or chloroform In senna it is, however, combined with calcium and magnesium, and in this form it is very soluble in water, although still insoluble in alcohol. The objectionable taste is removed, therefore, by alcoholic decoction, although the cathartic acid is only slightly altered Senna yields rapidly one or more of its properties to urine, and 20 or 30 minutes after partaking the drug the urine will indicate these properties by being reddened on the addition of ammonia Senna taken by wet nurses with equal rapidity influences the milk, purging the sucking infant. If injected into the blood, senna acts as a cathartic.

For further particulars see "Alexandrian Senna" under C. acutifolia, and for Senna substitutes see C obovata

Special Opinions -5 ' Bombay senna, prepared from the same plant as the senna imported from Arabia, has been for many years the only senna obtainable in this market It now seems likely to be driven out of the market by the lower qualities of Timnevelly senna, which are cleaner and can be by the lower qualities of Innevelly senia, which afte cleaner and can be purchased at one anna a b" (Surgeon-Haper W Dymock, Bombay). Powdered leaves are used in secondary syphilis" (Surgeon Major T, I. Ratton, M.D., Salem) "Senna leaves are always purchased in the bazárs and esteemed for their cathartic properties" (A Surgeon) efficient purgative, commonly taken by the natives as a cold infusion, causes griping and abundant flow of mucus' (Assistant Surgeon Shib Chunder Bhuttacharys, Chanda Central Provences "Not much used in these days" (Brigade-Surgeon S M Shircore, Moorshedabad)

CHEMISTRY

## Tanner's Cassin.

CASSIA auriculata. 74I

Cassia auriculata, Linn , Fl. Br. Int., 11., 263.

THE TANNER'S CASSIA.

STU. - SENNA AURICULATA. Roxb

Vern .- Tarmar, tarear, HIND , DUK. ; Tarola, BERAR; Tararada, MAR ; one—surmar, tarrar, 11110, UUK. 1, daria, IPRAR 1, daratada, MAR 1, Amal, aral, GU 1 : Amala, Cutch 1, Ariri, ammera terdi, aurai, TAM , Tangdan, 1hdopdu langar, TEL 1, Arareke, lengdu, langddiseida, átara fidd, taratadagida, KAN 1, Atara, fonnátíram, MALA 1, Kanavard, SING

References .- Roxb , Fl Ind , Fd CB C , 354 , Brandis, For Fl , 165 ;

Exhab.

Habitat — A tall shrub, with the virgate branches and under-side of the leaves finely grey-downy. Wild in the Central Provinces, the Western Pennsula, South India, and Ceylon; ofter planted elsewhere.

Gum.-It is said in Spons' Encyclopadia to yield a medicinal resin. very scarce; but Dr. Dymock informs the writer he has never seen this supposed resin, although he has frequently handled the bark. In Bengal a brownish sap hardens on the surface of wounds on the bark, this may

be the so-called resin

Tan and Dyc .- The bark is one of the most valuable of Indian tans. and is also, like myrabolans, used to modify dyes. It is said to give a buff colour to leather. Bidio remarks that "when the Government Tannery existed at Húnsúr, this bark was used almost exclusively for tanning purposes" This bark was highly commended by the Tanners who attended the conference on tanning materials held at the Colonial and Indian Exhibition in London It was regarded as a little too darkcoloured, but the leather shown as tanned by it was admired. It was recommended that an effort should be made to have an extract prepared from this bark for export to Europe similar to Cutch Mr Wardle in his recent report says "The bark does not produce much dye, only light

At Bangalore it is said to be sold at R60 a ton but that the price is rising owing to an increasing demand. The flowers yield a yellow colouring matter, apparently not used economically

6 " Skins of animals are tanned by soaking them in water in which the bark of this shrub has been infused for several days" (Honorary Surgeon P. Kinsley, Chicacole, Ganjam)

Fibre - Specimens of the bark were sent to the Calcutta Exhibition

GUM. 742

DYE & TAN. 743

> Flowers 744

FIBRE 745

this plant (Roxb.)

CASSIA The Tanner's Cassia. Burmann ii. MEDICINE Medicine .- "The sreps of this common Indian plant, like those of Seeds C. Aber o non a ... nt ophthal-746 ... Kirkpatrick constitute ire. They gular form. optusely == === dull olive Bark astringen, employed 747 it a perfect. and to the in sportice affects. worn the seems and wark appear worthy of further trials. A spirituous liquor is prepared in some parts of India by adding the bruised bark to a solution of molasses, and allowing the mixture to ferment" (Waring, Pharm. Ind , pp. 78, 79). Leavez A decoction or infusion of the LEAVES of this plant is much esteemed as a cooling medicine by the Singhalese, and also as a substitute for tea (Thwastes: Murray). Ainshe says that the Vytians reckon the 748 seeds amongst their refrigerants and attenuants, and prescribe them in electuary, in cases in which the habit is preternaturally heated or depressed, in doses of a small teaspoonful twice daily. Dr. Ainshe also records his opinion in favour of the use of the seeds in the treatment of ophthalmia, and he adds that for this purpose the powdered seeds are generally blown into the eyes Special Opinions .-- 6 " Bark substituted for oak-bark Seeds powdered Plant a good local application for ophthalmia" (Apothecary Thomas Ward, 740 Madanapalle, Cuddapah) "Antiscorbutic, antibihous, trifala, which is made up of dry -- ". ~ Flower-buds expectorant" (5 750 any part of it. decoction of the Surgeon a Kunnam Moosemar, Uningu removed and kernels thereafter powdered the eye, is useful in conjunctivitis" Bangalore). Food .- The leaves are eaten as a green vegetable in times of famine FOOD. Leaves. (Lishoa). 751 DOMESTIC Tooth-brushes Domestic Uses,-The branches are largely used by natives as toothbrushes, and are esteemed as preferable to those of any other plant for this purpose. The root is of great use to workers in iron for tempering the 752 Root metal (Ainslie) 753 Cassia Burmannii, Wight (in Madras Jour., VI., 1. 5). Vern .- The same as those of C. angustifolia, Vahl References....Brandss, For Fl., 1853 Gamble, blan Timb, 1361 Dale & Gibs, Bomb Fl., 81, Authition, Cat. Pb. Pl., 231 Pharm. Ind., 651 Moodern Shripf, Supp. Pharm. Ind., 632 Annile, 1, 389, O'Shaugh-nesty, Beng. Dispens, 397; S. Arjun, Bomb Drugs, A. Habitat .-- A gl-+bent; pod much of the valve oppo-Panjáb (Salt Range, ascending to 2,500 feet, where it is known as sanna)

and Trans-Indus (where it is called jijan), according to Brandiss it

	CASSIA
The Purging Cassia	Fistula.
Egypt, Nubra, and Abyssinia Medicine.—The whole plant is sold in the bazars as a substitute for the true senna under the name of country senna Ker and Abyssinia Medicine.—The whole plant is sold in the bazars as a substitute for the true senna under the name of country senna Ker action is of course Meca senna rs have confused this with that drug (Conf with	MEDICINE Plant 755
Cassia Buds See Cinnamomum Tamala, Nees, Laurineæ	}
C. Fistula, Linn, Fl Br Ind, II, 261, Wight, Ic, 1 269	756
THE INDIAN LABURALM, THE CASSIA FISTULA OF PURGING CASSIA, Eng., CASS OFFICINALE, CASSE MONDEE, CASSE, Fr.; ROHRENKASSIE PURGIERCASSIE, PISTELKASSIE, GERM, CASSIA, II., CANA FISTULA, Sp.  Syn—CATHARTOCAPUS FISTULA, Pers.; CASSIA FISTULA Willd, as in Rost, Fl. Ind  Vetn—Amalids, gumilah, Hind, Duk. Alah, ali, karangal, kiar kanifu Pa. Em k. 1. b. b. Ind. Duk. Alah, ali, karangal, kiar kanifu Pa. Em k. 1. b. b. Ind. Duk. Alah, ali, karangal, kiar kanifu Pa. Em k. 1. b. b. Ind. Duk. Alah, ali, karangal, kiar kanifu Pa. Em k. 1. b. b. Ind. Duk. Alah, ali, karangal, kiar banafu, Pagagarah, Unit, Yagagarah, Valla, Yagagarah, Valla, Yagagarah, kambar, rera, Gond, Banag, bangru, Kurku, Bahasa, banab baya bawa Mar, Garmal or garmala, GuJ, Aonrah kay, karak konrail kay, home, Tam, Rejiu, rela rala rela kayalu sucarnam, Tel., Konnak kaya, Mala, Kakee, Kan, Khyar shamir, katha ul Hind, Arban, Khyar chambar, Pers., Suvarnaha, aragbadha rajataru, Sans, Ahal la or shilla, Sing, Gonobiway, gnob krie, Durm.  References—Rosh, Fl. Ind., Ed. C. B. C., 38, Brandis, For Fl., 164; hure, For Fl. Burm, J., 39, Dedd., Fl. Sylv. or Gamble, Man Tongarah, Chang, Fl. P. G. Tongarah, J. Sylv. or Gamble, Man Tongarah, J. Burm, J., 39, Dedd., Fl. Sylv. or Gamble, Man Tongarah, J. Burm, J., 39, Dedd., Fl. Sylv. or Gamble, Man J. Sylv. or J. S. Benti G. Turm, Med. Pl. 87, U. C. Dutt Mat Med Hind, 155, Dymac Mal Med W. Ind., 20, 400, 500, 500, 500, 500, 500, 500, 50	
C  Habitat —A moderate-sized, deciduous tree of the Sub-Himálayan	1
, ascending to 3 000 feet	į

unous tracts skirting the and extending through chiefly occurs as a small leafless in March, the and fresh green leaves ond flowering occurs in blke pods, 1-11 feet in

	Dictionary of the Economic
CASSIA Fistula,	The Purging Cassia.
gum. 757	V = 1
DYE AND TAN. Bark. 758	Exhibition from Travancore.  Dye and Tan.—  alia. Dr. McCann  a light-red dye is chitacks of bark with 2 tolas of alum being boiled together. The colour is deepened by the use of pomegranate rind. Mr. Wardle reports that the bark contains only a very small quantity of colouring matter. It yielded yellowish drab with tusser silk, light fawn with corah and eri silks, and light yellow-brown with wool. The wood ash is used as a mordant in dyeing. In Dacca and in Cuttack the bark is used as an McCann
Medicine. Puip 759 Root dark 760	describes the process of tanning as follows: "Skins, after being treated with lime and cleaned, are so pounding the bark of sunars." to mentosa), and pods of sunars. To tomentosa), and pods of sunars. To tomentosa), and pods of sunars. The process (now Sir E.) Buck says it is used to a small extent in Cax npore and at Bijnor. Experiments were tired at the Government factory, the result being that amalfas bark was pronounced a very valuable tanning material. The North-Western Provinces do a small trade in exporting the amalfas bark.  Medicine—The Pure of the fruit and also the Root-Bark are used medicinally. They constitute, especially the former, one of the commonest and most useful of domestic medicines—a simple purgative. This drug is also used as a mild cathe pods be warmed to almond oil for use.  In small doses (37 to 7 8 gr.) it may be prescribed as a layative, and larger.
Flowers. 761 Bark. 762 Leaves. 763 Root. 764	doses (31'1 to 62'2 gr.) as a purgative. (U.S. Dispens) It is described as the combined of the
	presunct

The Purging Cassia.

CASSIA lanceolata,

known Lenetwe Electuary (Confectio Sennæ), of which it is an ingredient.

Special Opinions — "A very useful and safe purgative when procurable.

The pulp does not keep fresh more than a few weeks, even within

MEDICINE

the unbroken pod" (Brigade Surgeon S M. Shircore, Moorshedabad) "The fruit imported into Yarkand is there called Foluse" (Surgeon-

"The pulp of the ripe pod is common Major R. L Dutt, Pubna)

worm " (Assistant Surgeon T N Ghose, Meerut) "A good purgative, extensively used by natives" (Honorary Surgeon Easton Alfred Morris, Negapatam) "A favourite laxative and purgative amongst natives (Assistant Surgeon Nehal Sing, Saharunpore)

Food -The leaves, parched, are said to be eaten as a mild laxative with food. "The flowers are largely used by the Santals as an article of food" (Campbell) The pulp of the pods is largely used in Bengal to flavour native tobacco

Structure of the Wood,-Sapwood large, heartwood varying in colour from grey or yellowish red to brick-red, extremely hard The difference with tobacco in the fact that in the former the patches of white soft tissue form continuous belts, whereas in the latter they are rhomboidal, pointed at

the ends, and form interrupted belts The wood is very durable, but rarely of sufficiently large size for It makes excellent posts, and is good for carts, agricultural implements, and rice pounders

Cassia glauca, Lam, Il Br Ind, II, 1265

Vern .- Konda tantepu chettu, TEL ; Wal ahalla, SING.

References.—Royb, Fl. Ind., Ed. C. B. C., 352, Kurs, For Fl. Burm., I, 394; Gamble, Man Timb, 136, Thwaites, En. Ceylon Pl., 96, Balfour, Cyclop

Habitat .- A small tree of the eastern part of South India and of Burma to Ceylon and Malacca.

Medicine -The bark mixed with sugar and water is given in diabetes, and a preparation of the bark and leaves, mixed with cummin seed, sugar and milk, is given in virulent gonorrhæa (Balfour).

C. lanceolata, Roxb , Wall , W & A (but not of Forskhal); also [C. angustifolis, Vahl]

C. lanceolata, Nectoux, see C. acutifolia, Delile.

FOOD. Leaves 765

OWATE 766

TIMBÉR 768

769

MEDICINE. Bark 770

Leaves.

77I

Dictionary of the Economic
The Perping Cania.
length, tipen in the cold serson U O Dutt thinks this must be Rajatar, of the Sinskitt writers, it e king of trees.  Gum—Irom the stem exudes a red juice which hirdens into a gumm; substance This is generally known as kinickis. Its economic uses, in any, are all present unknown to authors on Indian economic science but it is stated to be a stringent. A specimen was contributed to the Paris.
I whistion from Trainnore  Dye and Tan — The birkis used in tinning, chiefly along with Terminal  alia Dr McCann reports that in the district of Lohárdagá, in Bengal  a light red dye is ob ained from the birk, with alam as a mordant, a  chitacks of birk with a tolin of vum being loided together. The colour  is deepened by the use of pomegranate rind. Mr Wardle reports that the birk contains only a very small quantity of colouring matter. It  yielded yellowish drib with tusser silk, light fann with corah and eri silks, and light yellow brown with wool. The wool ash is used as a tan. McCann  describes the process of training as follows: "Skins, after being treated  with lime and cleaned, are soaked in the astringent solution prepared by  pounding the birk of sunsin (Carsalpina digran), and oaking in witer  for as hours. The process of soaking is repetited three times." Mr  (now Sile E) Buck asys it is used to a small extent in Campore and at  Bijnor. Experiments were tried at the Government factory, the result  being that amall is birk way pronounced a very salable tanning mate-  rial. The North-Western Provinces do a small trade in exporting the  militar bark.
Medicine—The rut of the fruit and also the ROOT-BURK are used medicinally. They constitute, especially the former, one of the commonest and most useful of domestic medicines—a simple purgative. This drug is also used as a mild cathertic. The Makkaan ul Adviya recommends that the pods be warmed to extract the pulp which should then be rubbed up with almond oil for use. It is a safe purgative for children and pregnant women. In small doses (3 ot o 7 8 gr.) it may be prescribed as a laxative, and larger doses (31 tto 62 2 gr.) as a purgative (U.S. Dispens.) It is described as lentive and useful in rehewing thorace obstructions. It is often combined with tamarinds, and in this preparation is regarded as a good purge for
adust bile Externally it is useful in gout and rheumatism (Dymock) It is also employed in the essence of coffee. The Flowers are made into a confection, known as gut-kand, and viewed as a februlage. "The Bark and LEAVES rubbed up and mixed with oil are applied to pustules." (Drury) As in most other species of this genus, they are vitiled as an external applicant in skin diseases, especially in ring-worm. Mr. Campbell says that the Santals use an infusion of the leaves is a lixative. The rivine (Mrd. Top. of Afmir) states that he found the room act as a strong purgative. The waters asys that every part of the plant is used as a purgative by the Singalese. According to Bellew, the root is given as a tonic and febrilinge in the Panjab (Dr. Stewart Pb. Pl., 63).  The name Cassar Fistula Latin) and harding vopiy & (Greek) was first applied to a form of cunnamon very similar to the Cassia Lignes of the present day, the name Fistula having been given because of the bark being rolled up. The tree which now goes by that name was described by Abul Abbas Annabal of Sevilla in the threenth century, and the fruit is mentioned as a medicine by Joannes Actuarius who flourished in Constantinople towards the close of that century. The drug was a familiar remedy in England in the time of Turner, 1568 (Flick and Hanb. Pharmacog, 222). It is never prescribed at the present day in England, except in the form of the well-C. 764

CASSIA The Purging Cassia. lanceolata. is an ingredient. MEDICINE ive when procureks, even within Moorshedabad) luse" (Surgeon-Major 7. E. T. Astchison, Simla). "A poulice made of the leaves is said to relieve the chilblains which are common in Upper Sind beneficially used in facial paralysis and theumatism when rubbed into the affer affec. Shit act

reor I fr ounce with narm milk at bed-time is enough for a dose" (Surgeon-Major R L. Dutt, Pubna). "The pulp of the ripe pod is commonly used as a purgative mixed with tamarind pulp; taken as a drink at night, this acts on the bowels mildly the following morning" (Assistant Surgeon Shib Chunder Bhuttachary, Chanda, Central Provinces) "In the flatulent colic of children, it is commonly applied round the navel to produce motions. The new leaves worked down to a paste are applied in ring-worm" (Assistant Surgeon T N Ghose, Meerut) "A good purgative, extensively used by natives" (Honorary Surgeon Easton Alfred Morris, Negapatam) "A favounte laxative and purgative amongst natives" (Assistant Surgeon Nehal Sing, Saharunpore).

Food -The leaves, parched, are said to be eaten as a mild layative with food "The flowers are largely used by the Santals as an article of food" (Campbell). The pulp of the pods is largely used in Bengal to flavour native tobacco

Structure of the Wood -Sapwood large, heartwood varying in colour The difference with tobacco from grey or yellowish red to brick-red, extremely hard between the wood of this tree and that of Ougeinia dalbergiodes consists in the fact that in the former the patches of white soft tissue form continuous belts, whereas in the latter they are rhomboidal, pointed at the ends, and form interrupted belts

The wood is very durable, but rarely of sufficiently large size for It makes excellent posts, and is good for carts, agricultural implements, and rice pounders

Cassia glauca, Lam , Fl Br Ind , II , 1265

Mac.

Vern .- Konda tantepu chettu, TEL , Wal ahalla, SING.

References .- Roxb , Fl Ind , Ed CBC, 352; Kurs, For Fl Burm , I , 394, Gamble, Man Timb, 136, Thwastes, En Ceylon Pl, 96, Balfour, Cyclop

Habitat,-A small tree of the eastern part of South India and of Burma to Cevlon and Malacca. Medicine -The bark mixed with sugar and water is given in diabetes.

and a preparation of the bark and leaves, mixed with cummin seed, sugar and milk, is given in virulent gonorrheea (Balfour),

C. lanceolata, Roxb, Wall, W & A (but not of Forskhal), also [C. angustifolia, Vahl ]

C. lanceolata, Necloux, see C. acutifolia, Delile.

FOOD. Leaves 765

lowers 766

767 TIMBER 768

760

MEDICINE. Bark

770 Leaves

77I

	• •
CASSIA obovata,	Country or Italian and Jamaica Senna.
772	Cassia lanceolata, Torskhal
	This species is, by the majority of authors, viewed as quite distinct from either C. acutiolia or C. augustifolia. It is a native of Arabia and doubtless to a certain extent is used as a substitute or adultation for the Mecca senna. It differs chiefly from C acutifolia in having glandular petiolets, the plants are, however, very nearly alited, and as Forskhal's description is anterior to Dellio's account of C acutifolia both might be reduced to one, which in that case would have to receive the name C lanceolata, Forskhal. Most Indian authors give C lanceolata, Forskhal, but in the writer's opinion incorrectly, as a synonym for C angustifolia, Vali.
773	C. Lignea See Cinnamomum Tamala, Nees, LAURINEE. C. marginata, Roxb, Fl Br Ind, II, 262, Wight, III, 183
	Syn.—C Roxaurantt, DC Vern — Ursuid, uskiamen, Tut., Ngaomee, Burm, Ratoo-maa, Sing References — Roxb., Fl. Ind. Ed. C.B.C., 350 DC Prod. II. 489, W. & A. Prod. 385; Gamble, Man. Timb, 137, Thwastes, En. Ceylon Pl., 95, Bedd., Fl. Sylv., t. 182.
	Habitat — A small deciduous tree, with deeply cracked, brown bark, found in the Western Peninsula, and in Madras, Ceylon, and Burma (Thoungyeen forests)
TIMBER 1	Structure of the Wood -Heartwood light brown very hard The wood is well adapted for turning, naves of wheels, and handles of tools
775	C. mimosoides, Linn , Fl Br Ind , II , 266
	Vern —Patwa ghas, SANTAL
MEDICINE Root	Habitat.—Grows on the Himalaya, ascending 5,000 to 6,000 feet in Kumaón, and on the hills of Bengal and of the Khasia, to Ceylon and Malacca Medicine—§ Root given for spasms in the stomach (Rev A Campbell, Santal Mission, Pachamba)
776	C. nodosa, Ham, Fl Br Ind, II, 261
777	Vern — Gnu-theing, BURM References. — Stason's Burm, 404 770.
	Habitat -A common species in the Eastern Himalaya, Manipur, and
	Burma It has the properties assigned to most of the wild species
778	C. obovata, Colladon, Fl Br Ind, II, 264; Wight, Ic, 1 575
,,-	Syn — Cassia senna, Line, 'Senna obtosa, Reeb Known in India, as Country Senna, and is Italian, Tripoli, and Jaharda Senna, from its being one of the first species made known to Europe, it was cultivated in Italy during the toth century
:	Vetn.—Davi Tarrar, Bons References—Root II Ind (Ed CHC) 352, W and A Prof. 388; Mooden Shernf, Sup. Pharm Ind., 93, 3n fart, Fluck and Hand Pharmacog, 319, Bentley and Trum, Med Pl 19, 0' S. Disperes, 1999, Annile Med Med. II., 149; Treasury of Botany Dymock, Mat. Med. W. Ind., 203.
:	Habitat.—The Western Peninsula, Mysore, and South India, especially the Coromandel coast. A small shrub, with the leaves smaller fleat
	C. 778

Negro Coffee.

CASSIA occidentalis.

lets 3-6 pairs) than in C. Burmannil, and the pods not near so prominently tubercled over the seeds as in that species.

The writer is by no means certain that he is correct in regarding the plant known in Europe as C. obovata as distinct from the Indian corresponding species, still less, in viewing Roxburgh's Senna obtasa as more

> MEDICINE. Leaves 779

> > 780

#### Cassia occidentalis, Linn ; Fl. Br. Ind , II., 262.

THE NEGRO COFFEE,

Vetn.—Kasindi, bari-kasindi or kisunda, HipD and Duk, Hikal, Bons ; Kasamara, Sass. Kalkashunda, Beng, Nattam takara, feyd-teri, Tani; Kasindid, Tet., Natram takara, Maka ; Alalan, measit, matadi, Dung, Pen-léra, Sing. The same vernacular names are generally given to this speces as to C. Sophera.

are generally given to his species as to L. Supiness.

References.—W & A. Prod. 190; But Reg. 1 83; Roxb. Fl. Ind. Ed.

C.B. C., 352; Tawasies, En. Crylon Fl., 95; Dals & Gibs, Bomb. Fl.,

Bit. Altchason, Cat. Pb. Pl., 52, Pharm. Ind. 78; Mooders Steph.

Supp. Pharm. Ind., 94; Dymock, Mat. Med. W. Ind., 2 md. Ed., 203;

O. Shaughnesty, Beng. Dirpens, 300; S. Aryun, Bomb. Drugs, 4; Drury,

U. Fl., 127, Lisboa, U. Pl. of Bomb., 195; Spont', Encycl., 701, 703;

Ballour, Cyclop., Irtarary of Balany, Kra Offical Grade, Museum,

§ 50; Arw Reports, 1877, § 30; and 1851, pp. 34.3

Habitat .- A diffuse, sub-glabrous under-shrub, scattered from the Himálaya to the Western Peninsula, Bengal, South India, and Burma to Ceylon Probably introduced Distribution cosmopolitan in the tropics.

Medicine .- The LEAVES, ROOTS, and SPEDS are used medicinally; and by Hindu and Muhammadan writers they are supposed to have the same properties as C. Sophers. They are "alexipharmic, useful in the expulsion of and at L In the · · iey are em 2 10 the forr of the roo nst

minciple in W. Ind)

the leaves, taken internally and applied externally, are given in cases of itch and other cutaneous diseases, both to men and animals. The negroes apply the leaves, smeared with grease, to slight sores, as a plaster. The root is said by Martius to be beneficial in obstructions of the stomach, and in incipient dropsy " (Drury, U PI)

Chemical Composition.-Professor Clonet has analysed the seeds The following abstract of his views and results taken from the Year-Book of Pharmac; for 1876, f 179, will be found instructive -"Fatty matters (clein and margann), 49; tannic acid, 09; sugar, 21;

gum, 28 8; starch, 20, cellulose, 340; water, 70; calcium sulphate and

MEDICINE.

Leaves

78I

Root.

782

Seed.

783

CHEMISTRY.

CASSIA occidentalis.

Nerro Coffee.

MEDICINE.

phosphate, crysophame acid, o q; make acid, sodium chlande, magnesium sulphate, iron, silica, together, 54; and achrosine, 1353 parts in 100 The latter substance was obtained by exhausting the powder of seeds, previously treated with ether, by means of alcohol of 60 per cent; the alcohol is distilled off, the syrupy residue treated with absolute alcohol, which dissolves out various constituents, leaving a solid brown-red mass, having when dry a resinous fracture, and being soluble in water, to which it communicates a garnet colour. It contains C, H, O, N, and S, but its exact composition has not been determined. (It is most likely a mixture of various bodies ) It is soluble also in weak alcohol, and in acids and The colour cannot be fixed upon tissues by any known mordant. This circumstance induced the author to term it achrosine, or 'not-

colouring, although being coloured itself."

Special Opinions—5" Leases pounded and mide into a paste are applied to fresh wounds to bring on their healing by first intention." (Assistant Surgeon Anund Chunder Mukarji, Noakhali). "The mature seeds are used as an external application in ring worm. (Surgron J. H. Thornton, B A, M B, Mongier). The seeds are used in the treatment of scabies? (Surgeon-Major C W Calthrop, M D, Merar).

Food .- In the Kew Reports interesting information is given regarding

the use of the seeds of this plant as a substitute for coffee. The following passages may be republished here .--

"NEGRO COPPER.-The Commissioners of Customs forwarded to me in the early part of the year a sample of an article imported at the port of Liverpool from Bathurst, River Gambia, under the above name. They were identified at Kew as the seeds of Cassia occidentalis. According to Livingstone, these are used under the name of 'Fed-goso seeds' on the Zambesi as a substitute for coffee Monteiro, however, states in his Angola and the River Congo (Vol II, p. 249) that Independent are used only medicinally as a substitute for quinne. The seeds are roasted and ground, and their infusion taken either alone or generally

mixed with collee " (1877, p. 39) "These seeds occasionally find their way into the European market. The following extract from a letter from Dr. Nicholls of Dominica, dated September 27, 1881, shows that their use is well known amongst the negro

inhabitants of that island .-

"Cassia occidentalis is, I find, an excellent coffee substitute It is called in Dominica by the following names 'l'herbe puante,' café marron,' and 'wild coffee,' I have often heard of the negroes using the seeds of a native plant as coffee, but it is only lately that I have enquired into the

subject, with results that will, I believe, be of interest to you

"I collected some seeds and directed my cook to roast and grand them, so that I might taste the 'coffee' Other matters engaging my attention, I forgot the circumstance until several days afterwards, when one evening my wife enquired how I liked my after dinner cup of coffee I turned to her enquiringly, when she laughingly said, 'That is your wild coffee' I was indeed surprised, for the coffee was indistinguishable from that made of the best Arabian beans, and we in Dominica are celebrated for our good coffee. Afterwards some of the seeds roasted and ground were brought to me, and the aroma was equal to that of the coffee ordinamly used in the island

"I intend to send you a good quantity of the 'cafe marron' in its stages of preparation, in order that you may have an opportunity of undergoing my experience, and afterwards, you will, I think, be willing to raise Cassia occidentalis above the rank of a weed I may inform you that the plant itself is used by the native 'doctors' medicinally in the

FROD

Seeds.

784

NEGRO

CASSIA Sophora.

• *	
Cassia Oil. See Cinnamomum zeylanıcum.	
C. siamea, Lamk; Fl Br. Ind, II, 264	-0-
Syn.—C FLORIDA, Vahl , SENNA SUMATRANA, Roxb	785
Vern — Kassod, Bomb, Beats, manye konne, TAM, Sime tangadi, KAN; Waa, Sing, Maisalee, Burm	ļ
References — Rosb. Fl. Ind., Fd. C. B. C., 353, W. & A. Prod., 383, Kurs., For Fl. Burm. I, 392, Gamble, Man Tumb., 138, Thomatics, Et. Cyolo. Pl., 6v., Beidd., Fl. Sylv., t. 179; hew Official Guide, Museum, p. 49; Mason a Burma, 494	
Habitat.—A moderate-sized tree, with smooth bark, found in South India, Burma, and Ceylon Distributed to the Malayan Peninsula and	
Stard Structure of the Wood —Sapwood whitish, rather large Heartwood dark brown, nearly black, very hard and very durable. Used in Burma for mallets, helves, and walking stucks. In South India it is thite known, but it is considered one of the best kinds of fuel for locomotives in Ceylon (Beddom).	тімвен. 786
C. Sophora, Linn, Fl Br Ind, II, 262	, no
Syn - Senna Sophera and S esculenta, Roxb; C chinensis, Jacq; Senna purpurea, Roxb	787
Vett.—Banar, kisunda, bis ki kasindi. Hind , Kal kaihunda Beng , Sari kasindi, yangli talia, Dun , Awawade, Guj , Ran ishiala, Man , Ponns-eural perya takara: perd-eura: TAM; Pauds tangedu, nuti kashindha, kasu mardakamu, tagara chettu, TeL , Ponnám- takara, Mala, Kasamarda, SANS, Oru tora, SINGH	
Habitat —A closely allied species to C occidentalis, from which it differs by its more shrubby habit, more numerous smaller and narrower ). Cos-	' 
Himá-	
tic, and	MEDICINE
the Juice of the leaves is wewed as a specific in ring worm, specially when made into a plaster in combination with sandal wood. A paste made from the root is sometimes used instead of the juice of the leaves. The power of the	Bark 788 Leaves 789 Seeds
works as a remedy	790
in the form of infusion and the powdered seeds, mixed with honey, are given in diabetes ( <i>Drury</i> ). "An ointment made of the bruised seeds and leaves and of sulphur is used in itch and ring-worm" ( <i>Taylor's Top of Dacca</i> )	Julce 79I
C. 791	

CASSYTHA filiformis

#### The Foxted Cassia: Akaswel

MUDICINE Leaves 700 Seeds 800

Medicine.-The revers are used as an aperient, both traves and strus constitute a valuable remedy in all n diseases, chiefly for ringworm This is known in Sanskrit as Chale inited ! Dr Dymock says: "Ohakradatta directs the seeds to be steeped in the juice of Euphorba nertifolia, and afterwards to be made into a paste with cow's tirine as an application to cheloid tumours. He also recommends the seeds, together with those of Pongamua glabra, as a cure for ringworm" Muhimmadan writers " consider the seeds and leaves to have solvent properties in those forms of skin theerse accompanied by induration, such as leprosy, cheloid, psoriasis, &c, and mention their having been used with advantage in the plague (raba)" O Shaughnessy remarks that the leaves " are much used for adulterating senna" There is no evidence that this is done at the

Root 108

TIMEo owe шореал id smelled in the ildren as are conith sourthe root, ne of the

§"I have used the powdered leaves of a Cassia shrub common in obie's itch" (Defuty Surgeon-

FOOD Seeds 802 Coffee substitute 803 Leaves.

804

are eaten in times of scarcity. I to rma as morthy to

-21

America, and the syest muies (see to because as)

The tender leaves are boiled and eaten as a pot-herb They are largely used during times of famine (Lisboa) The Santals regularly use this pot-herb, both leaves and fruit (Campbell).

§ "The seeds are said to yield a decoction which is reported to be in every respect as good as coffee" (Mr C D Hardinge, Rangoon) "kind of coffee is made from this in Arracan" (Prof Romanis, Rangoon)

Cassis, see Ribes nigrum.

CASSYTHA, Linn, Gen Pl, III, 164

805

Cassytha filiformis, Linn , Fl Br Ind , V , 188 , Wight, Ir + 1847; LAURINEE

Alagjari, S Vern -Amarbelt, HIND , Cottan TAM BOMB , Amarvéla, MAR f Tel , Acatsjabulli, MALE References — Rovb , Fl s , Shway 342, Dals elerences — Korb, Fl 1 Fl, 223 Thwastes, Fn C 200 Dymock, Mat Med Murray, Pl and Drugs o C Dutt. * ", C. Pl Bomb Prugs, 115, Treast

C. 8c.,

#### Sweet or Spanish Chestnut

CASTANEA vulgaris.

Habitat .- A small parasitic plant, much resembling a Cuscuta, for which it is often mistaken; met with in almost every part of the coast of India and very general from Banda to Bengal It is common in the hotter parts of Ceylon, especially near the sea (Thuattes) Distributed to Arabia, Africa and America, and through the Polynesian islands to Australia

Medicine .- " Akaswel is used in native practice as an alterative in bilious affections and for piles" (Dymock) "It is put as a seasoning into buttermilk, and much used for this purpose by the Brahmins in South India" (Ainslie)

MEDICINE. 806

butter is it is emp plant mix UPl) :

by the natives in a vapour bath for tion being placed under the bed" (Assistant Surgeon Bhugwan Das, Rawal Pindi, Panjab) "Sanskrit writers describe it as a tonic and alterative, and regard it as possessing the property of increasing the secretion of semen" (U C Dutt, Civil

Medical Officer, Serampore). Domestic .- "A portion of the plant is by the Santal tied round the neck, arm, and ancles, as a cure for rickets" (Rev. A. Campbell, Report, Chutia Nagpur).

DOMESTIC. Charm. 807

808

#### CASTANEA, Gartn.; Gen Pl, III., 409.

FERÆ. Castanea vulgaris, Lam , DC. Prodr , av. , 2, 114, 683; CLPULI-

THE SWEET CHESTNUT OF SPANISH CHESTNUT; CHATAGONIER, Fr.; EDELLASTANIE. Germ

Syn.-C VESCA, Gartn

References -- Brandis, For Fl. 491, Gamble, Man Timb, 379, DC, Origin of Cult Pl, 353; Smith, Dic, 110.

Habitat .- " A large, long-lived, deciduous tree, of rapid growth, more rapid than the oak, introduced in the Himálaya, and grown in various localities, and especially in a large number of places in the Panjab and

the hills of the North-West Provinces, in Darilling, and the Khasia Hills" (Gamble). Cultivation.—" It has been sown or planted in several parts of the CULTIVATION

. . . . .

which bear two or three, separated by a membrane, which is the natural

state of the species" (DeCandolle, Org Cult Pl)
Food.—The nuts are caten. When ground into meal they form an important article of food for the poor. Mr. Atkinson says the tree was introduced by Sir John Strachey in Kumaon, and in Dehra by Dr.

Jameson, where the fruits are now brought into the market, Structure of the Wood .- Sapwood white, heartwood dark brown. Weight from 32 to 54 h per cubic foot "The timber is not so durable as that of oak; in the south of Europe it is used for building, furriture, and cask-states, but the legends of the roofs of old churches and other buildings made of chestnut timber, in France and England, are mythical, wherever examined, such timber has been found to be oak It copp ces FOOD. 810

TIMBER. SII

CASTANOPSIS tribuloides.

> F00D. 813

TIMBER

814

815

FOOD.

816

TIMBER.

817

818

# Probable New Tanning Material for India.

vigorously; along the Vosges it is grown for vineyard poles, in Kent and Sussex for hop-poles" (Brandis).

# CASTANOPSIS, Spach.; Gen. Pl., III., 400.

Several species of this genus are met with on the mountains of Eastern India, but none are reported to be used for tanning. This is probably an oversight, since the European members possess this property to a considerable extent, Castanea vesca containing 14 to 20 per cent. of tannic acid.

Castanopsis indica, Alph. DC., Prodr., XVI., 2, 109; CUPULIFERE.

References. Brandis, For. Fl., 490; Gamble, Man. Timb., 388; Kurt, For. Fl., Burm., 478; Balfour, Cyclop.

Habitat.—A moderate-sized, evergreen tree, met with in Nepal, East-

and the branches burnt for manure.

..........

nd is very largely is often pollarded

C. rufescens, Hook f. & Th.; Gamble, Man. Timb., 389

Vern .- Daine katus, Nepal; Strikishu, Lepcha, Hingori, Ass

Habitat.—A very large evergreen tree of Sikkim Himálaya, from 6,000 to 9,000 feet.

Food.—The fruit is small, but edible and of good flavour Structure of the Wood.—Gr belts of firmer texture, it is

cultural implements, and other
phylla, which it very closely res.
is more valuable as planking and posts wherever exposed to wet than
other species of this genus.

C. tribuloides, Alph. DC., Prodr., XVI., 2, III; Wight, Ic, 1 770.

Sym.—Castanea tribuloides, Kurs (11, 480); Quercus perox, and Q armata, Rood, Fl. Ind., Ed. C. B.C., 673 Vetta.—Tumari, kalony, Kumans, Iluri katha, kotur, chisi, mahn, shingali, Nebal, Bar hingori, kanta ngar, Ass. Dingsaot, Khista, Synghara, Tiperahi, Kanta dal dahara, Chittagong, Ayantan,

BULEN References.—Gamble, Man. Timb , 359; Brandis, For. Fl , 490; Balfour, Cyclop.

Cyclop.

Annual rings being good and

FOOD. 810 TIMBER 820

durable.

The Bay Chestnut The Ule Tree.

CASTILLOA

The tree coppies admirably, and with Castanopsis Indica, Quercus spicata, and Engelhardtia might be grown on the hills wherever firewood and charcoal forests are required

# CASTANOSPERMUM, A Cunn, Gen Pl, I, 556

"A genus of plants so named in consequence of the supposed resemblance of the seeds to the sweet chestnuts of Lurape"

Castanospermum australe, A Cunn , Leguninos E

THE MORETON BY CHESTNUT

References - Drury, U Pl. 124 Balfour, Cyclop , Smith, Dic , 110 Treasury of Botany

Habitat .- A tree of the sub-tropical regions of Australia, occasionally planted for ornament, introduced into India about thirty years ago Food -The seeds are eaten by the natives of Australia, but are un-

paintable to Europeans (Smith) Structure of the Wood - White, with a vellowish tinge, hard

CASTILLOA, Cerv . Gen Pl . III , 372

# Castilloa elastica, Cero , Unticiceze

THE ULE TREE

References — Brandis, For Fl, 427 hurs For Fl, Burm, II, 419; Smith Dic, 87 89 Spons' Encyclop, 1659-61 Reports of Bot Gar dens, Nilys Hills, for 1681-63, 1838-63, and 1838-80

Habitat - A lofty forest tree of the Bread fruit family, native of America, lately introduced into Ceylon and some parts of India In Ke.s Report for 1872, p 15, 18 given an account of the attempts made to introduce this glant into India Burma, Assam, Ceylon, and the lower slopes of the Nilgiris have now been pronounced as suitable for its cultivation

Mr. Ingeneran tentalentia -t -' 'n these days of uncertain coffee ous to cultivate any plant that " I have no doubt many local he hills will be found to

suit to Casti oa ai u wieje it will yield a profitable return to the cultivator" Colonel Campbell Walker writes of Castilloa cultivation in Calcut 'It has been found easy to raise these trees from cuttings I hope they

this place either from

because we have not Gum -The tree

ened, forms what is c tries the trees are cut do a and the est an a few inches of the b

vessels are placed un on exposure to the a of the juice of Ipomæa bona-nox

For further particulars of this gum see under "India rubber "

Castor Oil, see Ricinus communis, Linn, Euphorbiace#

elastica.

FOOD. 822 TIMBER

821

823

824

GUM 825

CASUARINA eguisetifolia.

Beelwood of Australia.

# CASUARINA, Torst, Gen Pl, 111, 402

826

Casuarina equisetifolia, Forst ; DC. Prodr , XVI , 2, 338 , CASU-THE BEEFWOOD OF AUSTRALIA ARINACEÆ

Syn -C MURICATA, Roxb , FI Ind , Ed C B C , 623

Vern -Jangli sare, Hind, Ján, Beng, Vilsyalitare misyali sare, saroka jhar, Bodb , Jurijur, mujjun Sind, Sarphkali sarosa suru, Mar Janglijhád, jangli saru, jangli saru, langli saru kangli saru kang tions, Cont with Tamarix.

References —Gamble, Man Timb, 34. Brandis For Fl. 435, Kurs For Fl. Burm, II. 494, Dats & Gids, Bomb Fl. Suppl 82 Pharm Ind., 30, Durney Brand Ind., 317, Moodeen Sterrif, Suppl Pharm Ind., 30, Dymoch Mat Med W Ind., 20, All 18, Annille Met Med Ind., II. 425 Murrey Drugs and Pl. Sind., 37, Latord, Dyes of India, II. 425 Murrey of India, 1, 45, Bulle, Cat Ram Prod Parts Eth, 41 S. Arjun Bomb Drugs, 43, Durry, U. Pl., 144, Badden Partell, Pp. P. 572, Latoda, U. Pl. of Bomb, 132, Kem Cat. 121, Hutching, Report on in Madrax, 1883, Report, Agra Deft, Madrax, 1887, pp. 38 39, Balfour, Cyclop. Smith, Die, 291, Treatury of Bolany

Habitat -A large, evergreen tree, with leasless, drooping branches and branchlets, which are deciduous and perform the functions of leaves Found on the coast of Chittagong, Burma, the Malay Archipelago, North Australia, and Queensland, cultivated all over India, except in the northwestern portion of the Paniab Thrives best in the sandy tracts near the sea shore. Introduced into the plains of India as a road side tree (valuable on account of the rapidity of its growth) about the beginning of the present century, and from its resemblance to the Tamana received the vernacular names of that plant

Cultivation -" It has been largely planted in North Arcot, South Arcot, Madras, and other districts of the Madras Presidency for fuel, for which it is excellent, but it requires to be near the sea-coast and to have water at the roots at least to feet from the surface of the ground Trees planted in sandy soil often suffer much from drought the first two or three years, the tap-root then finds its way down to about 10 feet, and reaching water the tree begins to thrive It is of course best near the sea, but fine trees may be seen in places in Northern India, especially at Saharanpur and Amballa" (Gamble)

The Madras Agricultural Report for 1878-79 gives particulars of the cost of cultivation of an acre containing 1,200 trees The initial cost is put down at R85 with interest at 10 per cent for four years this raises the gross capital to Riig At this time half the trees (600) should be removed Valuing these at 8 annas each the capital is returned and a balance left Two years later another 200 trees are removed worth Rt each,

and in the eighth or ninth year the land may be cleared, the remaining trees, at the lowest estimate, after paying all expenses on the same, would realize R600.

Gum - Reported to yield a good resin

Dye - The bark is used in tanning (Birdwood, Bomb Prod., and Bidre, Mad Exh List for 1855) A brown dye is extracted from it according to Balfour Mr Wardle remarks "The bark contains a small quantity of colouring matter, and produces in dyeing light reddish drab colours on each of the fabrics on which I have experimented" He further adds "The shades produced by this dye-stuff are very good

GUM 828 820

CULTIVATION

827

	<del>,</del>
Cedrelas or Toon woods	CEDRELA.
d. I for the data to the second	<del> </del>

though faint, but the dye-stuff contains too small an amount of colouring matter to be of any great value in the dye house. Lisboa says that it is used in Bombay as a mordant

Medicine—The bark is slightly astringent, and is employed in infusion as a tonic, according to Dr Gibson it is an excellent and at the same inne a readily available astringent, useful in the treatment of chronic.

diarrhea and disentery (Hurray)

Structure of the Wood -White, brown near the centre, very hard, it cracks and splits It is hard and heavy, and difficult to cut, weighs from \$5 to 62 fib per cube foot. "Cassarma seems to coppice well, and undoubtedly is, in suitable localities, and considering its extremely quick growth and the qualities of its wood, one of the most important trees we have for fuel and other plantations" (Gamble). "The wood is used for fires, as it burns readily, and the ashes retain the heat for a long time. It is much valued for steam engines, ovens, &c." (Treasity of Botany). Clubs made of the hard wood are used in Fig for beating the bark of the Paper Mulparary (Brossonetha papyrifera, Vent.) for the manufacture of Tapa cloth (Krw. Official Guide to Museums, 121). The natives of Australia make their war-clubs from this wood (Smith)

Domestic Uses -"The burnt ash is made into soap" (Smith)

Catechu, see-

_atecnu, see—

[A 139] (a) Acacia Catechu, Willd, Leguminosæ (black catechu)

(b) Uncatia Gambier, Rosb, Rubiaceæ (pale catechu)

[A 1298] (c) Areca Catechu, Linn, Paimæ (palm catechu)

Cattle and Buffaloes see Oxen

Cat, Civet, see Tigers and Panthers.

Catha. Several species exist in India, but by the Flora of British India they have been all reduced to Celastrus, which see

Catha edulis yields the Kat or Kafter of the Arabs, the leaves of which if chewed are said to prevent sleep. Sometimes imported into India, largely so to Aden, where they are used as a substitute for Tea,

Cat's-eyes, see Chaicedony.

Cat's-skins, see Skins.

Cauliflower and Brocoli, see Brassica (oleracea) botrytis B 851 Caustic Potash, see Potassium, also Carbonate of Potash, C. 527

Caustic Soda, see Sodium, also Carbonate of Soda

CEDRELA, Linn , Gen Pl , I , 339

The Flora of British India has reduced at least three if not four easily-recognisable trees to one species notes on retaining the old specific names to denote varieties. If dried specimens in the Herhanium do not scholist the characters of the Cederlas, there is no mistaking the living flants. C seriata, Rojle, is so dissimilar from C. Toona, Rozh, that were they to be found growing side by side, through the aid of a glass, they could be distinguished miles off. Theformer is a sparsely branched tall tree, with palmid ke clusters of pale green leaves, at the ends of its ascending branches, from which when in flower a paniele three or four feet long is suspended. This is the chivacterist form of the North-Western Him's lava at altitudes from 4000 to 8000 feet. It frequents damp shady streamlets, growing so gregatiously as to exclude all other trees.

DYE

MEDICINE. 830

timber 831

DOMESTIC Ash 832

833

۰33

834

CASUARINA equisetifolia.

Beefwood of Australia.

# CASUARINA. Forst.: Gen. Pl , 111., 402.

826

Casuarina equisetifolia, Forst.; DC. Prodr., XVI., 2, 338; Casu-THE BEEFWOOD OF AUSTRALIA. ARINACEE.

Syn, C. MURICATA, Roxb , Fl. Ind , Ed. C B C., 623.

Vern .- Jangli sarv, HIND . Jáu, Beng ; Viláyatisaro, miláyati sará, tille Jangii Sarr, HIND, Yan ISNO ; Filsyolisaro, onligati sero seroka jan; None ; Yarijur, mujum, Sino; Sarphalo, saroea, sure, Man ; Yanglijada, jangli-saru, janglisaru-chal, Duk.; Chouk, shani-ke-maram, shanshi-palitay, Tan, Serra, chavuku-man, chavak-maram, patio, Tel.; Keisrke, Mysok; Sura, Kan; Aru, chavuka-maram, Maha-, Tinya, Duran Many of the Indian names are moden adapta-balian serial s tions; Conf. with Tamarix.

Whis, Coll. With Actuality.

References,—Gamble, Alam Timb, 345; Brandis, For Fl, 425; Kurs, For Fl, Burm., Il., 494, Dalte, & Gibs, Bomb, Fl, Suppl, 62; Fharm. Ind., 217; Mooders Sterry, Subpl, Pharm Ind., 40; Dymach, Mat. Med W. Ind., 2nd Ed., 750; Annile, Mat. Med. Ind., Il. 432; Murrey, Drugs and Pl, Sund, 27; Lotord, Byes of India, 11, 43; Murrey, Of India, 1, 45; Bhite, Cal. Raw Prod., Paris Etc., 44; S. Aryun, Bombo, Drugs, 131; Drury, U. Pl., 121; Bader Powell, Pb. Fr., 572; Endo, U. Pl. of Bomb., 152, Kw. Cat., 121; Hutchins, Report on, 14 Madras, 1833; Report, Agrs Deby, Madras, 1879, pp. 38-39; Endyour, Lydob; Smith, Dic., 294; Treasury of Bolawy.

Habitat .- A large, evergreen tree, with leastess, drooping branches and branchlets, which are deciduous, and perform the functions of leaves-Found on the coast of Chittagong, Burma, the Malay Archipelago, North Australia, and Queensland, cultivated all over India, except in the northwestern portion of the Panjab Thrives best in the sandy tracts near the sea-shore. Introduced into the plains of India as a road-side tree (valuable on account of the rapidity of its growth) about the beginning of the present century, and from its resemblance to the Tamarix received the vernacular names of that plant.

CULTIVATION 827

Cultivation..." It has been largely planted in North Arcor, South Accor, Madras, and other districts of the Madras Presidency, for fue, for which it is excellent, but it requires to be near the sea-coast and to have water at the roots, at least 10 feet from the surface of the ground Trees planted in sandy soil often suffer much from drought the first two or three years, the tap-root then finds its way down to about to feet, and reaching water the tree begins to thrive. It is of course best near the sea, but fine trees may be seen in places in Northern India, especially at Saharangur and Amballa" (Gamble).

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of Risi. Two years later another 200 trees are removed, worth R1 each, and in the eighth or ninth year the land may be cleared; the remaining trees, at the lowest estimate, after paying all expenses on the same, would

realize R600.

Gum.-Reported to yield a good resin. Dye.—The bark is used in tanung (Birdwood, Bamb, Prod., and Bidie, Mad. Exh. List for 1855) A brown dye is extracted from it according to Balfour. Mr Wardie remarks. "The bark contains a small quantity of colouring matter, and produces in dyeing light-reddish drab colours on each of the fabrics on which I have experimented" He further adds; "The shades produced by this dye-stuff are very good

GUM. 828 DYE 820

#### Cadralas on Taon manda

CEDRELA.

MEDICINE.

TIMBER 831

830

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Medicine—The bark is slightly astringent, and is employed in infusion as a tonic, according to Dr Gibson it is an excellent and at the same time a readily available astringent, useful in the treatment of chronic

diarrhexa and di sentery (Iturray)

Structure of the Wood —White, brown near the centre, very hard, it cracks and splits. It is hard and heavy, and difficult to cut, weighs from 55 to 62 lb per cubic foot. "Cassurian seems to coppice well and undoubtedly is, in suitable localities, and considering its extremely quick growth and the qualities of its wood, one of the most important trees we have for fuel and other plantations" (Gamble). "The wood is used for fires, as it burns readily, and the rishes retain the heat for a long time. It is much valued for steam engines, ovens, &c." (Treasury of Betany). Clubs made of the hard wood are used in Fig for betaing the bark of the Paper Mullperry (Broussonetta papyrifera, Vent.) for the manufacture of Tapa cloth (Arw. Official Guide to Museums 121)

The natives of Australia make their war-clubs from this wood (Smith)

Domestic Uses — 'The burnt ash is made into soap" (Smith)

DOMESTIC. Ash 832

Catechu, see-

[A 139] (a) Acacia Catechu, Willd, Leguminosæ (black catechu)

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833

Cat's-eyes, see Chalcedony Cat's-skins, see Skins.

Cauliflower and Brocoli, see Brassica (oleracea) botrytis B 851 Caustic Potash, see Potassium, also Carbonate of Potash, C 527

Caustic Soda, see Sodium, also Carbonate of Soda

CEDRELA, Linn , Gen Pl , I , 339

834

The Flora of British India has reduced at least three if not four easily recognisable trees to one species not even retaining the old specific names to denote varieties. If dired specimens in the Herbarium do not exhibit the characters of the Cedrelas, three is no mistaking the living plants C seriata, Royle, is so dissimilar from C Toona, Rozh, that were they to be found growing side by side through the aid of a glass they could be distinguished miles off. Theformer is a sparsely branched tall tree, with palm like clusters of pale green leaves, at the ends of its ascending branches, from which when in flower a paniele three or four feet long is suspended. This is the chiracteristic form of the North-Western-Himá laya at altitudes from 4000 to 8000 feet. It frequents damp shady streamlets, growing so gregariously as to exclude all other trees.

_	· · · · · · · · · · · · · · · · · · ·
CEDRELA serrata.	The Toon woods,
	In the Monograph of the Meliacem published in 1878 by Oasimir de Candolle, the species of Cedrela formerly grouped under the one head of Cedrela Toona, Rost, have been separately described.  They are thus distinguished:—  Ovary glabrous—
	Leassets subsessile C. serrata, Royle Leassets subsessile . C. glabra, C. de Cand.
	Overy harry— Leaflets acute at the base C. Toona, Roxb Leaflets round at the base C. microcarpa, C. de Cand.
	Mr. Gamble, in his Manual of Timbers, XII., remarks that in his "Treet, Strubt, and Climbers of the Darylling District, three varieties were spoken of and separated as follows:—
	No. 1, the day a firmer was
	No 2
	No 3 Evergreen; flowering June; fruiting November-December; bank light- reddish brown, exfoliating in long flakes, found in the upper hills from 5,000 to 7,000 feet and of great size.
	"No t is C. Toona, Rosh: No 2 probably C. microcarpa, C. de  "" de Cand It nould, honever, have  t as 'deciduous in the cold season,' the rains.' There is perhaps a fifth
	"They may also be distinguished as follows by the capsule:  Capsule smooth (capsule found C. Toora.  Capsule covered with corky tubercles . C glabra.
	"Of the Northern Bengal specime and E 2333 will be C. glabra, while E 3623 will be C microcarpa. Som
	000 feet, 15 probably C multinga, 3M , Nee, Karen (Trade name, It has a light, soft, mink wood.
	with the usual characteristic scent strongly perceptible, and structure resembling that of the other species of Toon, the pores being perhaps more scantly distributed. Weight 35 5th per cubic foot."  The preceding remarks may for the present be accepted as indicating the Nepal plant, C. glabra, DC., and the Sikkim C. microcarpa, DC, as distinct from the following:—
835	Cedrela serrata, Royle, Ill, p 144, 1 25; Monog, DC., I, 742; [Mellaces.
	Syn.—C Toova, Rosh (Hook, FI Ind., 1,5%, in part) Vern.—Draw, dall, dal, daur, khishing, khisam, NW. H. Habitat.———————————————————————————————————
timber 836	frat tumerous large pores.

#### CEDRELA The Toon-woods. Toona. DOMESTIC. Domestic Uses .- Used about Simla, for the hoops for sieves, for bridges, and for many such purposes. The shoots and leaves are lopped 837 FODDER. for cattle fodder. 838 Cedrela Toona, Roab.; Fl. Br. Ind., I., 568; Wight, Ic., t. 161. THE TOON OF INDIAN MAHOGANY TREE; MOULMEIN CEDAR. Vern,-Tún, túni, lim, mahá-ním, mahá-limbo, túnká-jhár, túna, lúd. TIPPERA ; Somso, BHUTIA; lun, SATPURAS; Drawi, -1, chúti-sirin, der, dorí, 3 ; Túni, babith, lahehi. TE. ; Arana-maram, MALA; Suin, mils, SNER; Kal kilmer, Nivonsis, Sandam vembu, Tinnerelly; Tundi, kempi gandaghen; tunda, saulamra, kanda garga mara, deedari, Nan; Noch folianti, Cooka, Tunna, kuberaha, katha, nanduerikha, tunna-kuberaha, SNRS; Chikada, istitada, MAGN, Shurebed, Cinxan, Tinichado; BURM. References. — Roxb, Fl. Ind., Fd. C. B. C., 113, 633. Brandss, For. Fl., 72. Kurs., For. Fl. Burm., J., 225, Bedd. Fl. Sylv., t. 10.; Gamble, Man. Timb., 77, 79, 211; Dals & Glos., Bomb. Fl., 38; Stewart, Pb. Pl., 34; Atthison, Cat. Fb. Pl. on V. — 12.—12. Stewart, Pb. Pl., 34; Atthison, Cat. Fb. Pl. on V. — 12.—12. Ind., 55; Moodee Mel. Hind. 31 Ainslie, Mat Ina Powell, Pb. Pr., 3 Foretti, 10, 17.13 Dest, Cr., 18th., Tans of Beng., wood, Bomb Prod., 325, Lisboa, U. Pl. Bomb., A., 241, 25°, Biljour, Cyclop., Treasury of Bot., Kem Cat., 29, Francy's Med. Pl. and Brugs in A. Socy Res., Vol. X1, 163, Med. Fep., IV, 93 Habitat.—A large tree, about 50 to 60 feet in height, growing in the tropical Hamiltonian tricts o iding to 3,000 feet in the N. Distributed to Java and Austrau i. Gum -It yields a resinous gum, of which little is known at present. M Nees von Essenbeck has published an account of some expen-830 ments with the back, which indicate the presence in it of a resinous Astronent matter a te brown extract. engal generally DYE. ng cotton. This thust be to a small extent only, since Dr. Bidie omits it from his I it of 840 The flowers are boiled to extract the colour Madras dues sent to Pans which is known as basants in the North-West Provinces It is floor --

Flowers. Seeds. 811

9.0 and is a de-stuff at Palamau. Apparently Tan is not used as the mediane, and is rarely combined with other dies. The sulphor yellow (stanfig. of Campone is produced from tun, turmeric, I me, and ac dulated water. "It was a commoner practice under hat we rulers than it appears to be now to wear Lisartically red clothes in the spring, whence its name lasart or spring time. Saffower and tun are combined in Tima. Dr. McCann.

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236	Dictionary of the Economic
CEDRUS Deodara.	The Deodar or Himalayan Cedar,
medicine 848	remedy for ulcers and cruptions, for mange in horses and sore feet in cattle." (Gamble, 406)  Medicine.—The aromatic wood is employed medicinally as a carminative, diaphoretic, diuretic, and useful in fever, flatulence, inflammation, dropsy, urinary diseases, medicines (U. C. Dutt. coarse, very fluid kind of
FOOD. 849 TIMBER. 850	remarked that a drachm of the oil was as large a dose as the patient's codar oil thas been stomach could bear. Its use may be extended to other shin disease, with advantage Dr. Royle states that the leaves and small twigs of the Deodara are also brought down to the plants, as they are supposed to possess mild terefunthenate properties (Plarm Ind) In Kangra the twood is pounded with water on a stone, and the paste applied to the temples to relieve headache. Assistant Surgeon Sakharam Arjun describes the wood as butter stomachic, useful in fever, costiveness, piles, and pulmonary complaints.  Food.—The young shoots and plants are eagerly browsed by goats, &c.  Structure of the Wood.—Heartwood light-yellowish brown, scented, moderately hard. In each annual ring the outer belt of firmer and darker coloured ussue is generally narrow, and the mare belt is not very and trees and the structure of the wood in the spring wood wery line, unequal in with the structure of the wood in the spring wood wery line, unequal in with the structure of dark-coloured pores or interceituar cucts, which are prominent on a vertural section as dark lines, and in the vicinity of which the wood is sometimes more resinous.  In common with most species of the Order, the Deodar has well-marked annual rings which, there is little, if any, reason to doubt, each represents the growth of a year. More information has, perhaps, been collected on the subject of the rate of growth of Deodar than of any other species of the order, the Deodar has yeterilly exercise of the from the subject of the rate of growth of Deodar than of any other species of the from the subject of the rate of growth of Deodar than of any other species of the from the subject of the rate of growth of Deodar than of any other species of the from the subject of the rate of growth of Deodar than of any other species of the from the subject of the rate of growth of Deodar than of any other species of the from the subject of the rate of growth of Deodar than of any other species of th
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#### The Oleum Nigrum.

CEL ASTRUS naniculate

inner Himálaya, haying usually the age of trees 6 feet in girth TIMBED above 140 years;

7 W -1 ( - 1 A. -0)

and Those in the intermediate ranges and vallets having 6 feet in

girth for an age of between 110 and 140 years;
3rd—Those in the outer ranges under the full influence of the monsoon, and having the age of trees 6 feet in girth usually below 110 years

Deodar wood is extremely durable, being by far the most durable of the woods of the Himálayan conifers. It is the chief timber of North-West India, and is used for all purposes of construction,—for railway sleepers, bridges, and even for furniture and shingles. (Gamble)

# CELASTRUS, Linn.: Gen Pl. I. 364.

851

852

843

854

# Celastrus emarginata, Willd. CELASTRINEE

Syn.—Gymnosporia emarginata. Roth, in Fl Br. Ind., I, 621, Celas Trus emarginata, IV. and A, Prol, 160; Roxb, Fl Ind., Ed C B C, 263, Catha Emarginata, G Don.

C. oxyphylla, Wall

Syn.-Gynnosporia acuminata, Hook f : Fl Br Ind . I . 610

C. paniculata, Willd : Fl Br. Ind , I . 617 : Wight, Ic. 1, 158. BLACK OIL: THE OLEUM NIGRUM PLANT.

Syn.-Celastrus alnifolia, Don , C Dependens, Wall : C. Multi-FLORA and NUTANS, Roxb

FUNKA and NUTANS, Roeb VETD—MI Santhu, santhu (lexves, kolar, kuter), Pin , Malkahn, Oudhi, kuthanov, Malkanenn, Bevo , Kujar, kuter), Pin , Malkahn, Oudhi, kuthanov, Malkanenn, Bevo , Kujar, kujar, kutva, kujar, koho, Chiron, Mu (S. P.), Ankundan rangul, endroneur, C. P., Aanguni malkaneni Bon , Malkanena G. G. J. Malkanenur, C. P., Aanguni malkaneni Bon , Malkanena G. G. J. Malkanen, Mu kujar, kuthanov, Mu J. Malkanen, etaliku, Lari, Lari

Adiabed anidet , mem La , 31

CELASTRU paniculata	
01L. 855	Habitat.—A scandent shrub of the outer Himálaya, from the Jhelum to Assam, ascending to 4,000 feet; Eastern Bengal, Behar, South India, and Rurma; in Coulen is a constant of 2,000 feet.  or yellow oil, used been kept a short tim:  turns of a dark bistre colour. It is much admired as an external application along with a pouluce of the crushed seeds. It is also burnt in
	·
MEDICINE. OII 856	or black bottles, each containing about 1 oz., at prices from 12 annas to one rupee a bottle.  Medicine.—The red seeds are used medicinally, principally for cattle. They are given in rheumatism and paralysis. An empyreumatic oil is obtained from the seeds by a rude form of distillation, which is applied externally. This oil, under the name of "Oleum Nigrum," was brought forward by the late Dr. Herklots as a sovereign remedy in beri-beri. When administered in doses of from ten to fifteen drops twice daily, its action as a powerful stimulant is generally followed in a few hours by free diaphoriss not attended by exhaustion. It is specially efficacious in
Seeds 857	(Bade Dr. h. oil. aphrodisiacal and stimulant, iseful both as an external and internal remedy in rheumanism, gout, paralysis, are supposed to be caused by cold hum in such cases commencing with a dose creased to fifty by daily increments of c be applied externally, or the crushed seeds combined with aromatics. The latter application is said to be very efficient in removing local pans of a rheumatic or malarious nature " (Dymock, Mat. Mid. W. Ind., 144). Stayward that the said of th
Leaves. 858	use the oil in disorders of the stomach.  C " which is rent from the oil of the same seeds extracted by compression. The former is black and thick, with a strong and peculiar aromatic smell; and the latter, yellow and of the consistence of oil. The black oil manufactured at is the best. It is a good diuretic, diation in the best of the best of the consistence of oil. The black oil manufactured at it is a good diuretic, diation in the best of the

The Oleum Nigrum

CELASTRUS senegalensis,

patient except milk and bread—a restriction which is as injurious as unrequires rum in

uires m in

5 to 15

Mooden Sheriff, Khan Bahadur, Triplicane, Madras). "The seeds boiled in milk are used by natives in nervous affections. They are also used as food for qualis" (Assistant Surgeon Bhagwan Dats, Rawal Pinda, Panjab). "Said

Food for Qualis.

MEDICINE

in impotency, but
McKenna, Cawnp
by distillation fro
or three times a

patient is under this treatment he should eat meat roasted I have seen two or three cases of bern-bern cured by this treatment, and have also given it, with alar amount of success, in dropsy from aniemia " (Surgeon-Major Lionet Beech, Cocanada) "The juice of the leaves mixed with that of the leaves of Hydrocotyle assatica, and powdered spikenard, is considered a cooling application in inflammatory brain affections" (Assirtant Surgeon Sakharam Arjun, Banbay) "The 'black oil' Ohlande by

det should be observed, chiefly of wheat, chappatites, with fried meat, and mitk, and nothing else should be taken. Is an invaluable remedy among the people of the Northern Circars, especially of those of the malarious tricts." (Surgeon-Major E W Levinge, Rajamundry, Goddierry District). "Said to be useful as an aphrodisiae." (Surgeon-Major D R Thompson, Madrax)

Structure of the Wood .- Pinkish yellow, soft

Celastrus senegalensis, Lam

Syn -GYMNOSPORIA C

Vern — Sherawane, 7 kharai, PB, Baik babur, GONDI, Dha pedda chintú, TEL

References — Rozb Fi. Ind , Ed C B C , 208, Brands, For Fl &t , Kurs, Fi Burm , I , 252 Beddome, Fi. Sylvat , LXVI ; Dals & Gibs , Bomb Fi , 48, Gamble, Slan Timb , 87

Habitat.—A profusely-armed tall shrub, common in the northern dry and intermediate zones of Central, South-Western, and North-Western India, distributed to Afghámstan, Central Asia, and Australia. The Flora of British India distinguishes several forms C. montains, Rexb, comprises those forms which have the branches less profusely armed, and the leaves larger and broader, C. senegalensis, Lom, those in which the stems are more robust, and profusely armed, and the leaves smaller and narrower

Medicine — The BARK, ground to a paste and applied to the head, with mustard oil, is said to destroy fedicult

MEDICINE. Bark

TIMBER.

•	Dissionary by the Economic
CELOSIA argentea.	
862	Celastrus spinosus, Royle.
	Syn.—Gymnosporia Royleana, Wall., as in Fl. Br. Ind., I., 620. Vern.—Yallddhar. Hind , Dsaral, Trans indus; Kandu, karda, kanduri, kander, 16p, pataki, lei, ii, phápari, badlo, kadewar, Pa;
	nble,
MEDICINE Seed. . 863 TIMBER 864	Habitat.—A thorny, distorted bush, abundant on the outer North-Western Himálaya (Kumaon and Garwhal, altitude 1,000 to 4,500 feet) and distributed to the Concan and thence to Afghámstán, common on the Salt Range at about 5,000 feet in altitude.  Medicine.—In the Salt Range the smoke from the supposition of the sound of toothache.  Structure of the Wood.—Lemon-coloured, hard and close-grained; weight 40 ft a cubic foot. Gamble says the wood deserves attention as a possible substitute for bowwood, for carving and engraving. Baden Powell remarks that it is used in the Panjáb for walking-sticks.
865	Celery. See Apium graveoleus, Linn.; UMBELLIFERE.
Bombay.	CELESTITE; Mallet, Mineralogy, 141.
866	Celestite or Celestine is a natural mineral, found in rhombic or
Punjab 867	the Salt Range.
	CELOSIA, Linn.; Gen. Pl, III., 24.
	For botanical characters of the genus see under Amarantaceæ (A. 914).  The name is derived from kelos, burnt, in reference to the colour of the flowers in the common garden species.
868	Celosia argentea, Linn.; Fl Br. Ind., IV., 714; AMARANTICEE.
nedicine Seeds. 860 Oil. S70 FOOD. FOTI FORDER	names imply white-cock's-comb  References.—Rost, Fl. Ind., Ed. C.B.C., 227; Thwaites, En. Ceplon Fl. 127; Data & Glis., Bomb Fl., 125; Slewart, Ph. Pl., 181; Attchson, Cat. Ph. Pl., 180, Murray, Drugs and Fl. Smil, 100; Baden Fowell, Ph. Pr., 373, Lisbon, U. Pl. Bomb, 170; Balfour, Order Houris, Cropper Hubita.—An abundant weed of the fields in Central and Northern Indir (from Churn Nagpur to the Panjab), occasionally ascending to altitude 5,000 feet in the Humblaga, it is also met with in the warmer parts of Coplon. It appears very commonly in the monsoon servan.  Medicine—The SEEDs are officinal, being an efficiencious remedy in durchors. The Rev. A. Campbell says the Santals extract a medicinal of from them.  Food—The plant is used as a pot-herb in times of scarcity, and is
872	enten by cartle, especially buffaloes.  C. 872

873

Celosia: Celsia.

CELSIA coromandeliana.

Celosia cristata, Linn , Fl. Br. Ind., IV., 715; Wight, Ic., 1, 730.

Vern.—Kokan, pila-murghka, ili-murghka, Hinn; Mawal, taji shoras, bostán afras, kanju, dhurá-drá, Po. Máral, Kasiming, Lai márgá (the ved form), huli murga (the yellow), Ising; Erra kadu utta todaturu, kadi jutiu-tota-tura, Tei, Mayur antha, Sans; hyel-monk, Burm, References—Rox, F. I. ad., Ed. C. E. C. 282; Dale & Gibi, Bomb Fl. 215, Stemart, Pb. Pl., 182; Murrav, Drugt and Pl., Sind, 101; Badten Powell, Pb. Pr., 373; Balfour, Cyclop.; Treasury of Bolany; Spans, Encyclop, 938

Habitat.-Cultivated as an ornamental plant in the plains, and on the Himálaya, Kashmír (5,000 feet). In Spons' Encyclopædia occurs the remark that this plant is "Common all over Bengal and Northern India

generally."

Fibre.—"It yields a strong flexible fibre, so highly esteemed that rope made of it sells at five times the price of jute rope." Confirmation of this fact is much required, and also samples of the plant from which the fibre has been extracted It is known in Bengali as Lal-murga, but Roxburgh makes no mention of the fibre, indeed, with the exception of the notice in Spons' Encyclopædia quoted above, no author, as far as the writer can discover, alludes to the fibre.

Medicine,-The PLOWERS are officinal, being considered astringent: they are used in cases of diarrhoca and in excessive menstrual discharges.

The serps are viewed as demulcent.

Special Opinion .- § "Seeds demulcent and useful in painful micturi-

tion, cough, and dysentery" (Dr. U C. Dutt, Serampore)

Food - Cultivated in gardens-both the red and the yellow forms-on account of the stem, which is eaten as a pot-herb Professor Church (in Food-Grains of India) is apparently in error when he speaks of the food properties of the seeds of this plant. The writer can find no mention of the plant being cultivated on account of its seeds, nor indeed of these Besides, three of the vernacular names given by the Probeing eaten fessor are not names for this plant. Sil (and names derived from that word) are more correctly applied to Amarantus paniculatus, the seed of which is eaten, so that it seems probable Professor Church's account of Celosia cristata should be transferred to Amarantus paniculatus.

CELSIA, Linn , Gen Pl , II , 029.

Celsia coromandeliana, Vahl , Fl. Br Int , IV , 251, Wight, Ic., 1. 1400, SCROPHULARINER.

> Vern.—Lalskima, lokumá, Brno ; Lurli, Mar ; Lulakala, Sans References, Pash, F. F. al. J. d. C. R. C. at. J. Thomas, The Crylin Fr., 217 July 16-654, Bomb Fr., 177 Anthony, C. C. F. T. C. S. J. alege, 217 July 16-654, Bomb Fr., 177 Anthony, C. C. F. Fr., 153 July, 16-67, July, 178 Jul

Habitat.-An herb found throughout Ind a, from the Panjib to Pegu and Cestin, as ending to good feet in a titude. It general's appears during the dry seas in as a weed, on garden or cultivated lands

Medicine.-The inspissared states of the leaves has been prescribed in cases of acute and chronic disertery. It acts as a seditive and astron-(Plarm of Ind)

Special Opinions - 4" Juice of the whole glant, including the mre, leaves, and stem, squeezed out his pounding it, is used in hall chiefs h dower, m wn ng and even ng, in cases of sypt the empires. The june of FIBRE. 874

MEDICINE. Flowers.

875 Seeds. 876 FOOD. 877

878

MED'CINE.

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CELTIS, Town . DC. Pr. br. XVII. 168.

8Sr

Celtis nustralis, Finn., DC Profe, von., 163, 173, 1793 Curricen.
The I express Neetle then, the House, sexus Taxe.

Syn. - Page ball Brand one emit to some of all the Re of species are between that C. and the Re of the weak by full or first. Verm. Advant State 12 of, b. W. P. Alerst, S. Mer. Konton, form's Bred Blad, Blad Blog Blog As a he habitube well, keller, box for the first blog Blog. Kenner, forth stopp forth, fallen Aro Relatence. - Brands for F. L. T., Gambr, Man Timb, 1911 A chain, Cat 18 11, 1917 Free my of Flates.

Habitat.—A moderate-sized, decid-ous tree, found in the Sul man and Salt Ranges, and if noighout the Himbley fitter the India to Hutlin, ascending to the Soot letter also in it is Rhista Blub. Extens vely cultivated

FOOD, Fruit 882 FODDER. 883 in South l'urope

Food and Podder —The tree is lurgely planted for fodder; cous led
on the ferves are supposed to gave better milk. The fratte is also eaten,
"It is remulably sweet, and is supposed to have been the louis of the
ancients, the food of the Lotophage, which Horodous, Dioscorides, and
Thoophrastus describe as sweet, pleasint, and wholesome, and which
Homer says was so dehenous as to make those who ate it forget their
native country. The bettes are still caten in Spain, and Or. Wilsh
remurks that the modern Greeks are very fond of them." (Freat it of
Bolany). It is nowhere grown as a fruit tree in India, although, as
Akkinson adds, it is extent by all classes and is esteemed.

A dark-purple form of the fruit is called rotu and a smaller jellow form choku

TIMBER. 884 Structure of the Wood.—Grey or yellowish grey, with irregular streaks of dirker colour. Weight 47th per cubic foot. It is tough and strong, and is used for ears, whip-hindles, and for other purposes requiring toughness and circuity (Gamble).

BOMESTIC. 885 886 Domestic Uses—"The branches are extensuely employed in making hys-forks, coach-whips, ramrods, and walking-sticks" (Treisury of Botany).

C. caucasica, Willd ; DC Prodr , von , 170.

Vern - Botfar, brumis, brim is, brimla, bignt, bidgu, tharg, tharl, thirk, karik, tharak, thalk ki, fathum, ticho, wali imman, taurat, kirki, kar, kargam, laghum, takpun, kirg, kanghol nur, h (the fruit), Pp , Tighar, Pussitu.

#### The Nottle-trees

CELTIS cinnamomer

References.—Brandis, For. Fl., 428, 429; Gamble, Man. Timb., 344; Slemart, Pb. Pl., 209; Astchison, Cat. Pb. Pl., 170; Baden Possell. Pb. Pr. 574: Balfour, Cyclop.

The PRINT a small drupe, is eaten by the natives, who regard

100-21 1 and Structure

Pl., 200).

Celtis cinnamomea, Lindl.; Kurz, For. Fl. Burm., II., 472. Syn.-C. DYSODOXYLON, The.

Vern .- Garenda, Sing,

References. Gamble, Man. Timb., 343; Thw., En. Ceylon Pl., 267, Trimen, Cat. Ceylon Pl., 83; Dymock, Mat. Med. W. Ind., 748.

Habitat .- An evergreen tree, frequent in the forests of the Eastern Peninsula, from Assam and Chittagong to Pegu and Martaban; also common in Ceylon and the Malayan islands.

Medicine .- A light-brown wood, sold in India under the name Narakya-ud (or Hell's Incense), is used as a charm against exil spirits. This was described by Dr. W. Dymock in the 1st edition of his Materia Medica of Western India under its vernacular name. The writer's attention having been drawn to this, a correspondence was instituted. Dr. Dymock stated that the Dombas c and gome from Creter was then made ceited: "Ise

of the wood. orious of the ace of its persons nale grev

in India. Dr. Dr. thour agos additional information regarding the mood under the name of Celtis dysodoxylon.

ing people as pudacarpan. by the Dutch strunthout, ar its disgusting odour, which

larger branches. The smell ordure, that one cannot per

When the tree is rasped and the raspings are sprinkled with water, the stench is quite intolerable. It is nevertheless taken internally by the Singalese as an efficacious remedy. When scraped fine and mixed with lemon june it is taken interrally as a purifier of the blood in itch and other cutaneous eruptions, the body being at the same time anomied with it externally,"

TIRRE 887 Fruit 222 4002 CPINE

edy in amenor-

he has "been

Cual 800 DOMESTIC Charms. 801 Sandals. 802

MEDICINE. Wood. 804

	Dictionary by the Leonomic	
CELTIS Wightil.	The Nettle trees	
Medicine Price 895	Dr Dymock states "The peculiar odour is probably presence of napthylamine. The price of and of a cast. The Portuguese call it has thus still to be proved that t	due to th
	have been here recorded as a bas Indian trade in the wood is of some importance	: .
896	Celtis eriocarpa, Dene , DC Predr , AVII , 179	
	Vern - Akata, kaid a Hinn ; Ba kar, tat tamanku, Pa ; Ta References - Bran liss, For Fl., 470 Gamble, Man Timb , I owell, Pb Pr , 5741 Balfour, Cycl p	eka, Ara 343 : Baden
		-
DOMESTIC 897	Constate To Constant	
• • •	C. orientalis, Linn See Sponia orientalis Planch	
898	C. Roxburghil, Planch , Brandix, For Fl , 429	
	Syn - C. TRIVERVIA Rand Fl Ind, Ed C B C, 262  Vetti - kharak batkar brimaj brindu, Pa ; Cheri chara, C P ; Boxmaj, Boxma  Peletences - Redd Fl Sylv CCCAll Gamble, Man 7	
	References -Bedd Fl Sylv, CCCAII, Gamble, Man I Dals & Gibs Bomb Fl, 273 Lisboa U Fl Bamb, 131	
	Habitat ' en on common of the forests	of South
timber 899	Kumaon I- Structu use the wood for churn sticks	ithans
900	C. tetranda, Roxò, DC Prodr, AVII, 179 EUROPEAN MYRTLE TREE	
İ	Vern -Adona (1) Hind , Lumsum, sungsum Lercua, Haktapo	et a, Ass. :
		Fl 419 ! rray, Pl
	Ha'	istward,
TIMBER QOI	to the Ava Hills in Burma, also on the Western Chats Structure of the Wood —Greyish white, moderately hard Assam for planking and canoes	Used in
_	C trinervia, Roxb See C Roxburghil, Planch	
902	C. Wightn, Planch , DC Prodr , AVII 184, Wight, Ic 1	
	Ceylon	Pl, 267
TIMBER 903	Habitat — A small evergreen tree of the mountains of South In the Andaman Islands s also met with in the hot dry parts of Ce Structure of the Wood — Greyish white, very hard closed Weight 53 b per cubic foot Annual rings indistinctly marked by row belt without pores (Gamble)	nd a and cylon grained y a nar

C 903

Cemente

CEMENTS. 004

### CEMENTS.

CIMENTS, Fr., CAMENTE, KITTE, Ger.

The term "Cement" is applied to a class of substances used for uniting two bodies, and which ultimately harden and bind them together The following classification of these substances from Spons' Encyclopædia may be here given (a) Calcareous cements, (b) Gelatinous cements, (c) flittinous cements, (d) Resinous ecmenting compounds, and (e) Non resinous cementing compounds. Interesting information regarding the Cements of India will also be found in Balfour's Cyclopadia of India.

See also Baden Powell's Paniab Products (a) CALCAREOUS CEMENTS -These are of mineral origin, and are limited in number The mixture of lime and sand is an important cement of this class which is commonly known as mortar (See Carbonate of Lime ) There are also a few called hydraulic cements, such as Portland cement, which have the property of setting or becoming hard under water "Common lime does not possess this property, but limestones containing from 10 to 25 per cent of alumina, magnesia, and silica, yield a lime, on burning, which does not slake when moistened with water, but forms a mortar with it, which hardens in a few days when covered by water" (Page) "Portland cement is now made in Calcutta from argillaceous kankar, to which a fat limestone is added in the proper relation with the argillaceous constituents Hitherto this fat limestone has been obtained Ball, Econ

published water and .r polishing

cements" (See Cocoa nul Juice under Cocos nucifera)

(b) GELATINOUS CEMENTS - These have their origin in the substance known as "gelatine" obtained by boiling animal tissues in water. It is separated from water by simple evaporation, when it is converted into a dry hard substance called by different names such as "glue," "size,' "isinglass," &c according to the sources from which they are derived Of these, "glue" and "size are employed as cements, and in India a strong and useful glue, made from cartilage obtained from fish, is used by every jeweller and gold leaf beater

(c) GLUTINOUS CEMENTS -The base of this class of cements is a sub

Calcareous.

905

Gelatinous. 906

Glutinous 907

Resinous 800

stances used as cements

Adenanthera pavonina (seeds) (glutinous and Ægle Marmelos tenacious matter)

Artocarpus hirsuta (juice) A integrifolia (juice) Balsamodendron Roxburghii (gum-

resin) Bauhinia retusa (gum) Borassus flabelliformis (juice). Cratæva religiosa (fruit) Dichopsis elliptica (gum) Euphorbia Cattimandoo

(uice E Royleana (juice) Feronia Elephantum (gum)

Tamarındus indica (seeds) Typha angustifolia (down of the ripe fruit)

C. 908

(milky

915

·C. 915

CENTIPEDA White Behen. orbicularis. Resinous. The resin from the Sal. Shorea robusta, is employed by the Santals to repair metal cooking-pots. See also the list of plants under India-rabber and Gutta-percha. (e) NON-RESINOUS CREENTING COMPOUNDS .- The cements under this Non-resinous class are too numerous to be mentioned here. The reader is referred to 909 the list given in Spons' Encyclopædia, pp. 626-627. CENCHRUS, Linn.: Gen. Pl., III., 1105. Cenchrus catharticus, Del.; Duthie, Fodder Grasses, 15; GRAMINEZ. Syn.-C. ECHINATUS, Rich. Vern .- Bhurt, Hind.; Dhaman, argana, N.-W. P.; Basla, led, lapla, bhort, Pa.; Bharbhunt, Jeyrone; Bhasout, Ajuin; Kukar, BANDA. References .- Stemart, Pb. Pl., 252; Attehison, Cat. Pb. Pl., 163; Blurray, Pl. and Drugs, Sind, 10, 13; Duthie, Last of Grasses, N.-W. P., 9. " - arid ground in the plains of the e in the hot weather; nutritious FODDER. shoots are given our curing the nottest season (Crooke quoted by Duthie). OIO By some it is considered excellent fodder, by others only middling. The seeds are eaten in times of scarcity (Stewart). C. montanus, Nees. QII This fodder grass is known as the anjan and dhaman in the Panjab, and is considered by some one of the most nutritious of grasses and makes good hay. CENTAUREA, Linn.; Gen. Pl., II., 477. QI2 Centaurea Behen, Linn.; Composita. THE WHITE BEHEN OF WHITE RHAPONTIC. Vern .- Bahman safaid, suffaid bahman, Hinn., Bome.; Behenifor rgun, Bomb. Drugs, R Prod , 49; Balfour, Habitat .- A native of the Euphrates Valley. The root is largely imported into India, reaching Bombay from the Persian Gulf, It is always to be found in native druggists' shops. CENTIPEDA, Lour.; Gen. Pl., II., 430. Centipeda orbicularis, Lour.; Fl. Br. Ind., III., 317; Wight, Ic., 913 [1. 1610; COMPOSITE. THE THE CRE SO M8. : 11.53 rlon -nid · the t of MEDICINE. India, but the dry herb, both entire and in powder, is always to ne out ain-Seeds. ed in the druggist's shops." (Dynock, Mat. Med. W. Ind) "The powderd Levezs are used in affections of the head, such as colds, &c., as 914 Leaves.

#### Cultivation of Inecacuanha.

CEPHAELIS Inecacuanha

sternutatory. Boiled to a paste and applied to the cheeks, it is employed in the cure of tooth ache" (Murray).

MEDICINE.

Special Opinions -6 " Nak-chikni, sulphur, vinegar, and the leaves pityriasis versicolor (Surgeon-used for hemicrania" (Surgeon-

CEPHAELIS, Swartz, Gen. Pl. II, 127

016

Cephaelis Ipecacuanha, Rich , Fl. Br Ind , III , 178 , Bot Mag , [/ 4067, RUBIACEA IPECACUANHA ROOT, Eng ; RACINE D'IPÉCACUANHA ANNELÉE,

Fr , BRECHWURZEL, Germ SYR -C EMETICA Pers . CALLICOCCA IPECACUANHA, Brot . IPECA-

Ag Hort Soc , Vol V . b a

Habitat.-A native of Brazil, introduced into India and Burma, being cultivated at the Government Cinchona plantations with scanty success

CULTI-

able drug. An interesting sketch of the carry enorts in this direction is given in the following passages. The importance in India of ipecacuanha as a remedy for dysentery, and the increasing costliness of the drug, have occasioned active measures to be taken for attenn no several

always

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"With regard to the acclimatisation of the plant in India, much difficulty has been encountered, and successful results are still problematical The first plant was taken to Calcutta by Dr King in 1866, and by 1868 had been increased to 9, but in 1870-71 it was reported that, notwith-standing every care, the plants could not be made to thrise. Three plants, which had been sent to the Rungbi plantation in 1863, grew rather better, and by adopting the method of root propagation, they were increased by August 1871 to 300 Three consignments of plants, numbering in all 370, were received from Scotland in 1871-72, besides a smaller number from the Royal Gardens, Ken From these various collections, the propagation has been so extensive, that on 31st March 1873, there were 6 719 young plants in Silkim, in addition to about 500 in Calcutta, and much more in 1874.

> al Botanic Garders, Kew. Calcutta Bozane Garden Islands, and also stated

CEPHAELIS Ipecacuanha

## Cultivation of Ipecacuanha.

CULTIVA-

that "the peculiarly slow growth of this plant tends to prevent the culu vation of it from being taken up with spirit by I urope in planters. The insignificant struggling appearance of the plant is, besides, little calculated to excite enthusiam, or even interest, among the planting community" Mr. Oantloy reported from Singapore, in 1852, that the specacurntra plants grown in partial shade under some trees were transplanted into pots, and the change was found to be highly beneficial to their vigor-

ous growth (Kew Reports for 1877, 1892)
In communication with Messes P Lawson and Son of Edinburgh, Dr. Anderson arranged for the propagation of seedlings, and in 1870-71 had a few experimental plants sent to India. Some of these were cultivated in the Calcutta gardens and the others sent to Madris. Of the latter Colonel Beddome early reported that the higher regions of the Nilgiri hills were not found to be suitable. About this stage the Bombut Government became anxious that a consignment of plants should be furnished to that Presidency for cultivation at the Cinchona plantations at Mahabaleshwar. The first definite consignment of Messrs Lawson's seedlings was entrusted to Mr W. Walton of the Cotton Department, Bombay. The Wardian case, under the care of that gentleman, contrined 12 seedlings, all of which Dr King, in 1871, reported as having arrived in Calcutta in a health, condition. These were sent to having arrived in Calcutta in a healthy condition. These were sent to Darjeeling, one plant having died on the Journey Shortly after, several other Wardian cases, containing seedlings, were received at Calcutta, both from Messrs Lawson and from the late Professor Balfour, Superintendent of the Edinburgh Botanic Gardens

From the extensive official correspondence and reports which the writer has been permitted to peruse, it would appear that the process of acclimatisation has been attended with a certain amount of success early as 1874, it was reported there were at the Runghi plantation near Darjeeling 63,292 plants These were mostly, however, small root-cuttings, and Dr King (Fournal, Agri-Horts Soc. 1874, Vol. V p 47) wrote of them "The recent success in propagating has been entirely due to the discovery that this plant, unlike most others, can be propagated freely by root-cuttings, while from the slowness of the plant's growth, materials for stem-cuttings are yielded very sparingly. Propagation has all along been carried on in glass-covered frames and at an elevation of about 3 000 feet above the sea. Our efforts have naturally been confined hitherto to increasing the number of plants, so as to get a sufficiently large stock for experiment, with the view of determining the conditions under which Ipecacuanha can be grown as a crop. The work has been carried on by the Cinchona establishment, and very little, if any, special

expenditure has been incurred on its account.

"When this experiment in acclimatization was first begun, very little was known regarding the plant and the conditions required for its growth We have now learnt from expersence, that it is a humble creeping undershrub, of peculiarly slow growth, that it apparently requires a thoroughly tropical climate, by which I mean a pretty equal day and night temperature, the absence of a decided cold season and an atmosphere pretty steadily and thoroughly saturated with moisture. We have proved that it cannot stand exposure to a hot sun, and that it is apparently impatient of stagnant moisture at its roots. We do not as yet know what sort of soil best promotes the development of the root (the medicinal part), but

experiments are now going on with the view of settling this point.

"As already stated, what remains to be done is to find out how to grow Ipecacuanha profitably as a crop As a first step towards this, patches of plants have been put out at different elevations and under different

#### Cultivation of Inecacuanha,

CEPHAELIS Ipecacuanha

conditions as to soil, moist	ture, and shade. We have not even now a	JLTIV/ TION.
be remer	• •	
still tiny		
of growth		
"In c		
	a race is the case of the	
tr dı	'	
dı.		
ıt .	Post of the contract of the last	

a matter of very great importance. Fears were freely expressed, some twenty years ago, that the supply of the drug from South America would fail, and that the price would rise in consequence. These fears have, however, fortunately not been realized, and the drug is now obtainable at pretty much the same price as twenty years ago."

better than that of Barliyár" The last account gives the plants in the Government plantations of South India as having increased to 700.

In the official communication from Dr King, to which reference has South Indian experiments : of seeing some plants that plantations at Nillambore ry healthy indeed, and I is advasability of growing

the letter aiready quoted) says "The growth is so very slow, and the protection required in the cold season is so considerable, that I found I could not produce the drug in any quantity at the usual market rate (from the could not produce the drug in any quantity at the usual market rate

(from the state of 
supply."

it may be reacu
Tion.

anha can be grown in India has been shown, but with the exception of the locality in South India mentioned above, so far no other district has been shown to alford the hope that it can become an important commercial product. There are doubtless, however, many other similar regions where it might be grown. The plant grows slowly, and has little in it to attract the attention of the cultivator, so that it may be doubted when private enterprise may be prepared to releve the Government of its present;

#### Medicinal properties of Ipecacuanha.

CEPHAELIS Ipecacuanha CHEMISTRY.

"Emetine, discovered in 1817 by Pelletier and Magendie, is a bitter substance with distinct alkaline reaction, amorphous in the free state as well as in most of its salts; we have succeeded in preparing a crystallized hydrochlorate.

"The root yields of the alkaloid less than I per cent; the numerous higher estimates that have been given relate to impure emetine, or have been arrived at by some defective methods of analysis.

"eich (1863) was C²⁰ H²⁰ N² O³,

and lastly that found in 1877

ing the powdered bark of the isting the mixture with boiling the mixture with boiling the chloroform, petroleum benzin, or ether. It is a white powder, turning

to grains of

tew drops of water. Dry the mixture in the water bath and transfer it to fly, then id, and ded will wateh a saturation a saturation as a saturation.

a satulution of to the nitrate Power's test may

"In the wood, separated as exactly as possible from the bark, is used, and the experiment performed in the same way, the solution will reveal only traces of emetine. By addition of nitrate of potassium, no precipitate is then produced, but tannic acid or the potassico-mercuric iodate affords a slight turbudity. This experiment confirms the observation that the bark is the seat of the alkaloid, as might, indeed, be inferred from the fact that the wood is nearly tasteless.

Securative acid, regarded by Pelletier as gallic acid, but recognised is reddish brown, amorphous, to caffetannic and kinic acids;

and a large quantity of pectin. The

and the wood more than 7 per cent, or starch (Pharmacographia, p 374)

Special Opinions.—§ "Applied locally to bites of venomous insects and scorpions" (Surgeon-Major C W Colthrop, Morar). "With out-door patients suffering from dysentery, Ipecacuanha in large doses was found unsuted and inconvenient. The following formula in such cases was read to be about the convenient of the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was found to be about the collowing formula in such cases was read to be about the collowing formula in such cases was read to be about the collowing formula in such cases was such as the collowing formula in such cases was read to be about the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases was such as the collowing formula in such cases with the collowing formula in such cases with the collowing formula in such cases with the collowing formula in the collowing formula in such cases was such as the collowing formula in the collowing form

alarious origin, Surgeon Peter et efficient calm-W. Farquhar,

Votacamuna).

CEPHALOSTACHYUM capitatum.

Coccinia Indica.

919

CEPHALANDRA, Schrad.; Gen. Pl., 1, 827.

Cephalandra indica, Naud; Fl Br. Ind., II., 621; Wight, Ill., 1. 105; CUCURBITACE.E.

MEDICINE, Julco. 920

is directed to be taken in doses of one tola along will a purely order or ning" (U C Dutt, Mat Med Hind) The Root, according to Moodeen Sheriff, is sold as a substitute for habor (Cappatis spinosa root) in the bazars of Southern India The leaves are of a deep green colour, and are useful as a colouring agent in preparing Savine ointment from the essential oil "The BOOT when cut exudes a somewhat sticky juice, which hardens into a reddish gum on drying, and is very astringent, but not bitter like the fruit" (Dymock) "The bark of the root, dried and reduced to powder, is said to act as a good cathartic, in a dose of 30 grains" (Medical Topography of Dacca, 58). "The LPAVES, mixed with ght, are applied as a limment to sores. The whole plant, bruised and mixed with the oil of Enphorbia perifolia. administered by natives in special diseas

Leaves. **Q22** 

Root.

Q2I

are applied externally in eruptions of the sl gonorrheea" (Balfour) "In the Conca cure sores on the tongue" [Dymock] Food — The oblong rRuir, about 2 to 2½ inches long, green when young, scarlet-red when ripe, fleshy, smooth, is eaten both raw and "," a). The fruit is one of the com-

FOOD. Fruit. 923

It is eaten fresh when ripe and

924

Cephalocroton indicum, Beddome, 261; Euphorbiacen.

A common tree in the moist forests of South India (altitude 1,500 to 4,000 feet), yields a timber useful for building purposes

CEPHALOSTACHYUM, Munro; Gen Pl, III., 1213. (See Vol. I., B 69, No. 9)

925

Cephalostachyum capitatum, Munro; GRAMINER. Vern .- Gobia, gopi, Nepat, Payong, Lepcha; Silli, sullea, Khasia. Reference - Gamble, Man Timb , 420

Habitat -- Found in Sikkim and the Khásia Hills

Wax	CERA alba.
- ' - ' - ' - ' ften gregatious bamboo, on flower- is exten by the natives in times of der	FOOD Grain. 926
Structure of the twoods are 12 to 30 feet long, strong, with internodes about 23 feet thin, pellow, used for bows and arrows by the Lepchas It flowered in Sikkim in 1874 (6 imble)	71MBER. 927
Cephalostachyum latifolium, Munro Reference — Gamble, Man Timb , 429	928
Habitat.—A species with large leaves, found in Bhutan	}
C. pallidum, Munro, Kurz, For I'l Burm, II, 363 Vern - Bete Ass.	929
Reference — Gamble, Man Imb, 429  Habitat — A bamboo with shrubby stems It grows in the Mishmi Hills and in Ava	
C. pergracile, Munro; Brandis, For 17, 567 Veta - Zin-zo, lengua Burn	930
References -Aurs, For Et Burm, 11, 554, Gamble, Man Timb., 429  Habitat.—A bamboo common in upper mixed forests of Burma, often gregarious It has stems often 40 to 50 feet long	ĺ
CERA.	1
Cera alba and flava.	93 <b>1</b>
Wax (which see for further information, as also Honey)	]
tic hes, at 195	}
Descriptic breaking wit I ke odour	1
nothing to co  Bo ling water in the behavior and han cooled control found blue by tod ne hight Occurs ir not unctuous to t  Ind )	) !
Medicine—"Honey is emollient and slightly laxative, and is often  igh mixtures and gargles. Wax  as occasionally been prescribed in  its chief use is as an intered entire.	MEDICINE 932
Dose of White Wax from ten to twenty grains suspended in a mixture by aid of mucilage (Pharm Ind) For further information see Bees, also Wax Special Opinions — § The oil is used as a limitent and is of great value	
in muscular and chronic rheumatism' (Surgeon Major A S G Jaya-kar, Muskat, Arabia)	{
·	ı

CERATONIA Siliqua.

## The Carob Tree.

Ceramic Manufactures, see Earthen-ware. Cerasus cornuta, Wall, see Prunus Padas, Linus,

# CERATONIA, Linn. : Gen. Pl., I., 574.

033

Ceratonia Siliqua, Linn.; DC. Prodr., II., 486; LEGUMINOSE. THE LOCUST-TREE; THE CAROB TREE, ST JOHN'S BEAN, OR BREAD OR LOCUST BEAN; ALGAROBA of Spain; CARRUBIO, II.; CARUBA, Ger.

> Vern .- Kharnúb, kharnúb núbti (the pods), PB.: Kharnúb shams or khirnuo nubii, Arab.

> References.—Roxb, Fl. Ind., Ed. C.B.C., 361; Brandus, For. Fl., 166; Gamble, Man. Timb., 133, 145; Dals. & Gibs, Bomb Fl. Suppl., 26, Steman B. Dl. Pl., 3 S. Ars Ham Romb . reasury India Duthre in ingir more, our man journal, + 1, + ot , New Series, 98

Habitat. A slow-growing, evergreen tree, indigenous in Spain and Algeria, the eastern part of almost naturalised in the Sal

CULTIVA-

Cultivation -" The carol southern coast of Anatolia and in Syria, perhaps also in Cyrenaica Its cultivation began within historic times The Greeks diffused it in Greece and Italy, but it was afterwards more highly esteemed by the Arabs, who propagated it as far as Morocco and Spain. In all these countries the tree has become naturalised here and there in a less productive form,

very exhaustive paper on the istract of all that is known on the subject, while at the same time it deals fully with the efforts which

have in India been made to introduce the plant.

934

chi

by any extremes of temperature or excessive moisture" (Alkin-Him Dist, 885) Mr. G Ricketts of Allahabad made experiments

son, Hem Dist , 885) and I adobes the tops over pytramet wall

## CERATONIA Caltiration of the Carob. Siliqua. In the Panill, comit treat in quartities of seed have been sown from as CULTIVAenth, as feet, in the divincts of Par pat, Gurgarn, Reitak, and Delhi, with felection access. In 15/2 some of the send imported by Mr. George Ricketts were tred at Labore and Ferongore. The tree was found to thrive, "though it does not give rapid's, and dies not yet ripen its seed, er indeed produce godi, except in tare instances. One ce two lemale times es sted in each of the Labore gardens, and were out down by the cuper, Vardalite, prelat's because to did not care to be bestered by questions from the Agri-Horts usual Society as to the e progress? (Stewart, Pt. Pl., 61) Mr. Ricketts was of opin on that the seeds should be we'll easked before plant og, and the trees when planted out should not be too far from each orber to ensure their fruit rg. In Madrat, the experiments were made in various localities, but the princial result was anything but satisfactory. The seeds did not germi-tate in some cases, and in others, the seeds legs soon did did. 936

In Bem' sy and Sind - Dunng the last two years, District Forest Officers in the Bombay Presidency Lave Leen engaged in carrying out

experiments with care b seed, but il e results do not appear to have been very promising. In Sand the Conservator states that all the plants were

as the plants have vernment gardens The peculiarity of From the female ! were obtained in if protected from

Dr Bonavia reported that some of the trees attained a height from 18 to 20 feet and were in a very healthy condition. Mr. Duthie recommends the tree should be planted on well-drained soils.

The Lower Provinces of for the cultivation of Car

reported on favourably.

facilitated by carefully pecling off a portion of the seed-coat,
The North-Western Provinces, Panjab, and Oudh are recommended as the best localities for the purpose; but it must be admitted that on the

whole the efforts to introduce the tree into India have not been successful. Medicine.—Mr. Baden Powell says that the pods are used by the are said by ٠. igent. The

· ectoral, and to them as medicinal. Food.-The pods, full of sweet, nutritious pulp, are a common article

of food in the Mediterranean for man, horses, pigs, and cattle, and are imported into the Panjab under the name of Kharnub-nubti (Brandis). They form an important constituent in the patent cattle-foods. They are supposed to be the "husks" of the Prodigal son, and the "Locusts" of John the Baptist.

938

937

MEDICINE. Pods.

939

FOOD. Pods.

940

transport and process of succession

CURATONIA Siliqua.

The Cares Tree.

Ceramic Manufactures, et Pantenware Cerasus cornuta, Wall, and Prints Patie, Louis,

# CERATONIA, Ista , Got. Ph. 1, 571

033

Ceratonia Siliqua, Lore, o DC Profe, 11, 485, Inchigence, THE LOCUSTREE, THE CARDS TREET ST Jone's Bert, or Berto.

on Louist Beir, Accierce of Spice, Canada, R.; Carles, Gir.

Vernie Razenth, tharmed makes the portio, Pair Radenth etters or

Hirmas mustic Assa.

Hiral) mali, AAA.
Ritoritoria, m. E. I. d. J. E. G.R. C., prof. Francis, Ext., R., prof. Gardin, F. C., R., prof. Gardin, J. J. C. L. L., prof. F. C. L., P. C., P.

Habitat. - A sire-growing, exercises tree, and genous in Spain and Algeria, the existern part of the Med terranean region, and in Siria; now almost naturalised in the Salt Hange and other parts of the Panjab.

CULTIVA-

934

Cultivation -" The careb grew wild in the Levant, probably on the southern cases of Anatolic and in Syria, perhaps also in Cycenaca. Its cultivation began within historic time. The Orresh diffused it in Greece and Italy, but it was affectived in the Cycenace by the second of the Arabs, who propagated it as far as Morocco and Spain. In all these countries the tree has become naturalised here and there in a less productive form, which it is needful to graft to obtain good fruit. The carob has not been found in the tufa and quaternary deposits of Southern Europe. It is the only one of its kind in the genus Crairosts, which is somewhat exceptional among the Lraustivosa especially in Europe. Nothing shows that it existed in the ancient tertiary of quaternary flora of the south-west of Europe" (DiCandelle's Orne, of Cult. Pl., 37).
Mr. J. E. O Gonor published in 1896 a very exhaustive paper on the

subject of the Carob tree. This gives an abstract of all that is known on the subject, while at the same time it deals fully with the efforts which

have in India been made to introduce the plant.

The experimental cultivation has been carried on in most provinces, but

chiefly in the North-West Provinces, the Panjab, and Madras.

In the North- West Provinces it was first introduced by Dr. Royle in 1840, and nearn "was introduced by Dr. Jameson from Malta in 1801, and by 1863 it was extensively propagated and distributed in the Dun. The trees, though they flourish well, do not seem to give pods in such quantities as they yield in Malia and Italy. In 1866 the same report was received, and in 1850 it was decided to try to improve the quality of the pods by grafting, which, in Italy, not only produces better fruit, but gives a yield in a much shorter space of time. The trees appear to be unaffectyield in a much shorter space of time. The trees appear to be uniffected by any extremes of temperature or excessive moisture" (Atkinson, Jim. Dist., 883). Mr. G. Ricketts of Alishabad made experiments at Benares and Cawnpore, and found that the tree grew extremely well in the latter district. Mr. Duthle is doubtful of the extent to which the Carob is likely to be able to stand "the spaking condition of the ground during the rainy season."

CERATONIA

Siligua.

	· ·· · · · · · · · · · · · · · · · · ·		· ·	CULTIVA- TION. 935
	•			
or indeed produce pods trees existed in one of owner, Vandal-like, pro by questions from the (Stewart, Pb. Pl. 63). I be well soaked before pla be too far from each of	the Lahore gard bably because he AgriHorticultura Mr. Ricketts was canting, and the tre	ens, and were cut e did not care to Il Society as to th of opinion that the ees when planted o	down by the be bothered eir progress" seeds should	936
1			d not germi-	,,,
very promising. In Sind	I the Conservator	states that all th	istrict Forest carrying out to have been e plants were	937
** *		•	· ; ; ]	
slowness of growth will mental shrub in gardens the Presidency are of a s	. The reports from	om other stations in t some stations the overn The Fre t were	n all parts of e plants have ment gardens peculiarity of om the female e obtained in	
parrots" (Indian Daily	News, 1883).	•	rotected from	
In Oudh, the tree di ported that some of the t in a very healthy condition planted on well-drained. The Lower Provinces for the cultivation of Ca	rees attained a her on. Mr. Duthie re soils. of Bengal are, acc	ght from 18 to 20 ecommends the tree eording to Dr. Kin periments in Haz	feet and were ee should be	938
×			ا و د د د	
natives in coughs attached Ainslie to be viewed hisk of the pode has	.d.d		y are said by ingent. The	MEDICINE. Pods. 939

940

E

husk of the pods has astringent. The aut medicinal.

pectoral, and les to them as

256

CERBERA Odollam.

#### The Carob Tree.

In the Treasury of Bottiny occurs the following account of Carob pods as a food stuff: "These pods contain a large quantity of agreeablyflavoured, mucilaginous, and saccharine matter, and are commonly emplayed in the south of Europe for feeding horses, mules, pigs, &c, and them have been imported into England t although they form ar agreeable arnele

price, and were used by singers, who imagined that they softened and cleared the voice By fermentation and distillation, they yield a spirit which retains the agreeable flavour of the pod." Professor Church in Food-Grains of India (p. 170) states that "The nutrient ratio is here about 1: 8 5, and the nutrient value 68 As sugar, pectose, gum, &c, occupy the place of server a state of calculated in the or

than starch, cont-

flourishes in a dr.

ratued for

Lal the no le of the best kinds

inal carat 871-1879) anchisian

TIMBER. 941 OMESTIC. 942

943

# CERBERA, Linn , Gen Pl , II , 699

Cerbera Manghas, Linn., see Tabernamontana dichotom, Roxb , APOCYN ICEA

C. Odollam, Garin , Fl Br. Ind , III , 638; Wight, Ic . 1 441.

Syn .- C LACTARIA, Ham , TANGHINIA ODOLLAM, LACTARIA, and LAURI. POLIA, Don

Vern. Daber, dhakur, Beng, Lada ma, kat arati, kadaralai, kadu,

FIBRE. Rark, Seeds. 045 Sap. 046 Leaves.

047

Habitat .- A small tree of the salt snamps, or of the coasts of India, Cevion, and Burma, common in the South Konkan

> 1883 by the

> > o the is the

ent by

	REVISIÆ rmentum.
number of safe and efficient medicines of both classes is quite large enough, and there is reason for believing that this tree, even in moderate quantity of the control of the first that the state of the first is sonous. Resputable, when taken internally, comiting and purging, soon followed by collapse and death "(Surgeon Major J. M. Houston, Travancore: John Gomes, Eag., Medical Storckeeper, Trevandrum).  Structure of the Wood—Grey, very soft, spongy. Annual rings marked by a sharp line; weight, 21th per cubic foot. It is only occasionally used for firewood.  Domestic Uses.—The poisonous Juice of the fruits was formerly used in Madagascar as an ordeal in cases of suspected crime or apostacy (Kew Cat., 96).	MEDICINE.  Nut. 948 Fruit. 949 Eark. 950  TIMBER. 951 DOMESTIC. Ordeal Nut. 952
Cerbera Thevetia, Linn., see Thevetia neriifolia, Juss.	
CEREALS.  The term "Cereal" is applied to all chible grains obtained from the	953
DATS, INDIAN-CORN, and the reader is information. such as the print of the control of the contro	
Cerevisiæ Fermentum.	(
YEAST PLANT OF TORULA CEREVISIE.	954
	}
Reference.—Fharm Ind., 551.  The history of yeast is replete with interest, even although many of the details of the action of the plant in the process of fermentation are unexplainable even at the present day. There is little doubt but that the discovery of the peculiar effect of yeast upon sugary liquids, in converting these into alcoholic beverages, has been known from antiquity, and that too by the most remote and diverse members of the human family.	
latter into sugar, wine the acid itsen temains unchanged in quantity or c	955
,,,,	

CEREVISIÆ Fermentum.

The Yeast Plant

chemical nature. In the process of beer-brewing two manifestations of the same kind are met with. The grun from which the beverage is to be prepared is first mostened either with hot water or by being placed in a warm confined atmosphere. As the result, it sprouts or germinates. The chemistry of this action consists in the fact that in a warm most atmosphere the simple contact of a substance known as distance with the sturch of the grain converts the latter into sugar. Distance may be defined as a transformed condition of gluten produced within the seed during the first stage of germination, and no sooner is the distance formed than it immediately commences to act upon the insoluble starch. This is a wise provision of nature. The embryo plant is imbedded.

and on being subjected to moisture, it germinates or sprouts. A portion of the gluten degenerates into diastase, and the simple contact of this sub-

the infant plant feeds upon the food stored up for it within the seed. It produces first a root and then a stem, and by the time the nourishment contained within the seed has been exhausted, the root has commenced to absorb food from the soil in fermentation this curious property is taken advantage of The grain is first germinated, and when by simple contact the resulting production of d astase has converted the starch of the grain (or malt as it is now called) into sugar, the germination is stopped by the malt being dined. After breaking the grain, the soluble and insoluble starch products are washed out of the husk with warm water, It has

diastase I 1,000lb of mix- (Com-A-356) ar, the lastase, this, the

brewer filters the wort, for the boiling has not only killed the diastase, but has coagulated it, as also all the other albuminous matter, and by filtration the turbidity is removed

nuration the turbuly as cumber.

The yeast is now applied and the liquid kept for five or six days at a fixed temperature. The fungus rapidly grows and multiplies, What nourishment these minute plants take has never been clearly established, but through their simple presence or contact with the sugar they cause that

substance t in the liqui

A curious

on the san fermenting one brew with yeast reared on another. The modern system of Pasteurising beer by heating it in carbonic acid gas is practised with beers fermented at low temperatures. These beers, containing no yeast, are clear, and are at the same time found to stand the climate of Ind a in some respects better than the beers that used formerly to come to this country in such large quantities. The yeast is killed by the process of heating to 60°. In the brewing of beer only about a quarter of the fermentable substance is comerted into alcohol, the remainder giving the

956

057

958

CEREVISIA or Torula Cerevisiae. Fermentum. sweet fla menting tact of c sugar produces alcohol. It has already been said that there would appear to be other sub-stances which similarly produce fermentation. Through the kindness of Mr. O. B. Clarke the writer received from the Khásia Hills a small cake prepared from a fungus found growing on the flowering heads of what appears to be a used like yeast and important . to procure tha to endure for 1 suitable for baking, th use than hitherto. discovered at a small powder prepared from the wood of an extensive climber, the ingredients being baked with a little water and son done . . I get the nest of a formant er was not in flower, howver, and he was unable to name it for certain, so that it may even prove kinds plant v with • 1. and reaconinea (the bark), the iruns of Phynanthus Emblica, leaves and pods (bhang) of Cannabis sativa, and Datura fastuosa (the seeds burned on a charcoal fire, over which empty vessels are placed to get impregnated The flowers are placed in earthen vessels and mixed up and distilled. with a powder produced from the barks of the following trees : Terminalia belerica, T. tomentosa, Phyllanthus Emblica, Anogeissus latifolia, Shorea robusta, and the roots of common rice After a time the mahua ferments and is distilled, but the distiller carefully preserves the earthen vessels for future use, having discovered that if not washed out these vessels

will cause the mahua flowers to ferment without the aid of the astringent barks. Rev. A. Campbell informs the writer that the Santals use Ruellia suffruticosa, Rosb (the chaulta), when they wish to prepare a pleasant beverage from rice, but add to this Clerodendron serratum, Spreng. (the Saram lutur), to make the beverage intoricating According to some authors, an alcoholic beverage is prepared from the juice of Calotropis CHÆTOCARPUS castaneæcarpus

## Ceropepia : Iceland Moss

Reference .- Ralfour, Cyclos

Habitat.-Grows in Khasia Mountains, Burma, and Tenasserim,

978

Ceropegia bulbosa, Rovb, var esculenta, Fl Dr Inl, Il', 67, Wicht. Ic . 1.845

Vern -Ahappar kadu, Ilino ; Patalatum bari, Bosin References - host R Ind, Fl C.B.C, 250; Dale & Gibs Romb Fl 183; Voigt, Horl Sub Cal 534; Dymack Viat Virl W Ind, 2nd Fd, 825, Luboa, U Fl of Bomb, 195; Raifour, Cyclop

FOOD. Tubers 979 Leaves, 080 Roots, 081

ó82

Habitat - Met with in the Panjab and in the Hombay Presidency Food -Tunres and LPALES are used as pot-herbs in Multan and Sind Shepherds are fond of eating the tubers, which they consider to be tonic and digestive "Every part of this plant is eaten by the natives, either raw or stewed in their curries. The fresh Roots taste like a raw turnip" (Roxburgh)

C. tuberosa, Rosb , Fl Br Ind , IV , 70

กรุงกร. ร์

Ter. Bomb rugs

Habitat -- Met with in the Deccan Peninsula from the Konkan southwards

MEDICINE. Tubers. 983

Medicine - "The starchy somewhat bitter Tubres, are used as a nutritive tonic in the bowel complaints of children" (Dymock, Mat Med W Ind ) They are also eaten It is probable the economic information given under C balbosa and this species has been confused or is equally applicable to both plants and perhaps to one or two other species such as C juncea and C acuminata

Cetaceum, see Physeter matrocephalus, Linn , MANNALIE

Cervidæ, the family of the deer, of interest economically for their antiers and their skins See "Horns" and also "Skins"

## CETRARIA.

985

984

Cetraria islandica, Achar, Licheves,

ICELAND MOSS

References -Pharm Ind , 258 Flack & Hanb , Pharmacog , 737 ; O'Shaughnessy Beng Dispens , 672

MEDICINE 086

Medicine -Imported into India and sold in chemists' shops

Cevadilla or Sabadilla, see Asagræa officinalis, Lindl , Lillaceæ Ceylon Moss, see Gracillaria (Plocaria) lichenoides, Greville, ALGE

CHÆTOCARPUS, Thw., Gen Pl, III, 323

987

Chætocarpus castaneæcarpus, Thw , DC Prodr , XV , 2, 1127 , EUPHORBIACER

Vern - Bulkokra, Beng , Palakuna, sadacaku, Tam , Hedika, hidawaka SING

987

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Chara and Natella.	CHARA involucrata
References Kurs. For Fi. Burm., 11., 222. Gamble, Man Timb., 375. Tamsies. En. Cey on Fl., 255; Trusca, System. Cat., Ceylon Fl., 81 Habitat A. moderate-suzed tree, found in the Khásia Hills, Eastern Bengal, Burm., the Andimin Islands, and Ceylon.	1
Structure of the Wood - Light red, moderately hard, close-grained weight 55% per cubic foot; used in Ceylon for building	988 988
CHAILLETIA, DC.; Gen. Pl., I., 341.	
Chailletia gelonioides, Hook.; Fl. Br. Int , I., 570; CHAILLETIACE	989
Sym.—Moscurar Gelovioides, Roeb, F. Int., Ed. C. B.C., 254 Vern.—Mosdarra, Singer, Brvo ; Balu-malvia, Sivo. References —Kava, For Fl. Barton, I., 132, Gamble, Man. Timb, for Beld, Fl. Sylv, 15; I Pamille, Fr. Crylon Fl. 70; Frimen, System Ca. Crylon II., 17; Dale 'G Gis', Bomb Fl. 52, Lubsa, U. Fl. Bomb, 47 Habitat.— \ \text{mail} subd eccous tree, commonly met with in the hill castern parts of Bengra! and Silbet, in the forests of Madra, and in th Western Peninsula on the Ghåts from the Konkan southwards; it is also	<u> </u>
ooo feet. 's specially "residency the value	990
Chalcedony, see Carnelian.	
Chalk, see Carbonate of Lime.	
CHAMÆROPS.	991
Chamærops Ritchieana, Griff.; Gen. Pl., III., 924; see Namorhops Ritchieana; Palmæ.	1
Chamois Leather, see Leather & Skins.	1
Chamomile or Camomile, see Matricaria Chamomilia, Linn; Com- Chanay Kéléngu, see Tacca pinnatifida (?) [POSITE	
Chank shells, see Shells and also Pearl Fisheries.	1
CHARA.	{
Chara involucrata, Roxb; Fl Ind, Ed CB C., 648,	002
Vern Jangli pálá, Hino, Jhanj, Beng (These vernacular names are applicable to all Charas, indeed to most submerged plants)	) "
Habitat.—There are a large number of species both of Chara and Nitella found in tanks and pools of water near Calcutta during the cold and hot season.	
Dome** [[se- "!]	DOMESTIC. Clarity sugar. 993
C	1

### CHARCOAL.

## Timbers used for Charcoal.

# Charcoal, see Carbon.

994

## CHARCOAL, Timbers used for-

Ables Smithiana. Acacia arabica. A. Catechu. A. modesta. Adhatoda Vasica (gunpowder). Albizzia procera. A. stipulata. Anacardium occidentale. Anogeissus latifolia, Betula cylindrostachys. Boswellia serrata. Buten frondosa (gunpowder). Cafanus indicus (gunnowder). Callicarpa arborea. Calotropis gigantea. Cascaria glomerata. Cassia Fistula. Castanopsis tribuloides. Colebrookia oppositifolia (gunpou der) Corchorus capsularis (gunpowder). Cornus macrophylla (gunpowder). Cynometra polyandra. Daphne mucronata (gunpowder) Dillema indica. D. pentagyna. Echinocarpus dasycarpus. Ehretia Wallichiana. Elæocarpus lanceæfolius. Eucalyptus Globulus. Eugenia tetragona. Euphorbia antiquorum.

Excentia Arallocha, Ficus cordifolia. F. infectoria. F. religiosa. Hippophæ rhampoides. Juniperus excelsa. Pieris ovalifolia. Pinus excelsa. P. longifolm. Premna latifolia. Prosopis glandulosa. P. spicigera. Ouercus liex. O. incana. O. semecarpilolia. Q. spicata. Rhododendron arboreum. Salix tetrasperma (gunpowder). Semecarpus Anacardium. Carta in proposition to non deel. Stereospermum suaveolens. Tamarix articulata. Terminalia myriocarpa. T. tomentosa. Xvlosma longufolium.

idded

995

Dr. Schlich, in a note (dated January 1883), regarding the supply of fuel for the Barwai iron-works (in Holker's territory) near Nimar, estimated folia, scep-

tons of pig iron a day, 372,604 maunds of charcoal would be annually required, or say 1,800,000 maunds of firewood.

Chaulmugra, see Gynocardia odorata, R. Br.; BIXINEE.

Chavannesia esculenta, A. DC., see Urceola esculenta, Benth.

Chavica Betle, Miq., see Piper Betle, Linn ; PIPERACEE.

C. officinarum, Miq, see Piper officinarum, C. DC.

C. Roxburghii, Miq., see Piper longum, Linn.

Chay root, see Oldenlandia umbellata, Linn.; RUBIACE E.

	OPODIUM lbum.
Cheep, see Shells	
Cheeronjee (chironji or chirauli) oil, see Buchanama latifolia, Roxb.;	
Cheese, see Ghi. [Anacardiace#	
, -	
Cheilanthes tenuifolia, Sw; Filices.	996
Vern -Nonha, dodhari, Santal	99-
The Reverend A. Campbell writes that the Santals prescribe a pre- paration from the roots of this fern for sickness attributed to witchcraft or the evil eye.	
CHEIRANTHUS, Linn.; Gen Pl, I., 68.	1
Cheiranthus Cheiri, Linn ; Fl. Br. Ind , I , 132; CRUCIFERE.	997
THE WALL-FLOWER.	\
Ver 7 1	'
the state of the s	
References Stewart, Pb Pl, 13; O'Shaughnessy, Beng Dispens, 186; Drugs and Pl, Sind, 40, S Med West, Ind, 2nd Ed, 50, n Fowell, Pb Pr, 37, Baifour,	
Habitat.—Cultivated in gardens in North India, but is not indigenous, known as "Viole gialle," or yellow violets	
OI _ The med can	OIL. Flowers.
enc	998
· ·	MEDICINE.
יום אונב נעננוו אם ייי ייי ייי וופ אוצט וופ אונב נעננווי אם ייי ייי	000
sphrodisiac" (Surgeon J. Ander-	Petals.
son, MB, Bijnor).	Seeds IOOI
CHENOPODIUM, Linn.; Gen, Pl, III, 51,	l
A genus of annual or perennial herbs, belonging to the Natural Order	1002
CHENOPODICE. (279, a goose, and ruis, a foot)  Erect or prostrate herbs. Siem angled Leaves alternate, entire lobed or toothed Flowers minute, 1-5 merous Opary free, depressed or compressed. Styles 2 3 Seed hontontal or vertical, testa crustaccous, albumen floary	
There are about 50 species of the genus, met with in the world. These are distributed in all climates, India possesses seven species, with perhaps numerous varieties and cultivated forms of most of these.	}
Chenopodium album, Linn.; Fl. Br. Ind , V., 3; CHENOPODIACE	1003
THE WHITE GOOSE-FOOT.	-303
SynC. viride, Linn ; Roxo Fl. Ind , II , 58.	}
C. 1003	

CHENOPODIUM album.

The White Gover fort

Vern —Baiká sag or be'huá sák, chandan belá, Bano and Ilind ; Bacháa, báiká, janság, lánaá, Po Planna, Ire (Chryan Valler) and Fm (though Po ; Bethua, charál jan 18g, bhias N W P. Ma'ua and t, Santa, and kharána sag, linn in Santa Pegganas, Chalant, Bonn ; Phil Shon, a Aballak ke baji Dug ; Parupa dag, Tan , I afan kura, Tel.; Sasink Sans ; Kulf, And

References — Root, F. I. Ind., I. I. C. D. C., No. Stewart, P. D. P. 1. 178; Attchism, Gat Ph. Pl. 188; beigt Hort Sub Cal. 237; U. C. Dutt, Mat. Mied Hini 12 O Shaughnessy, Rene Dispert, 323 Vier toy, Drugs on I'l Sink, 103; Bad in Lowell, Ib. Pr. 172, It bod, U. Pl. Bomb. 169; Atthinson, Him. Dist., 698, 708 731; Buth, Dyta and Tans, N.-11' P., p.; Balfour, Cyclop

Habitat .- Common throughout the tropic and temperate Hamilaya from Kashmir to Sikkim, ascending to 12,000 feet above the sea, and in Tibet to 11 000 feet General in the plains of India from the Paniab to Bengal, Western and Southern India Wild and also cultivated

There are various cultivated and wild forms of this plant. Voigt describes three of these (a) album proper, chanden bely of Bengal . (B) winde. the bette shak, entirely green and (y) parparenm, the lalboths a form with "the angles of the stem and branches of a fine purple colour leaves and the mealy panicles somewhat reddish"

Slawari describes what appears to be a form of this plant as a Cheno-podium which he was unable to identify He gives the following vernacular names for it, and expresses the opinion that it is quite equal to C. Ouinoa -

Vern - Mustakh, hasumin; Gaddi sinngar, bajari bang, ratta, Rav , Strides Blas: Bithe, bathe take, Surley, Gnie, Ladak, PB

The leaves of this plant "are eaten as a pot-herb on the Sutley, but the plant is chiefly cultivated for its grain, which is considered better than

buck-wheat " Dye -A decoction of the PLANT is added to the indigo solution, to aid the fermentation process to which the dye is subjected before it is applied This practice prevails at a certain town named Chibraman in the Farakhabad district (Buck, Dyes and Tans, N-IV P, 9) Compare

with the use of Cassia Tora, C. 798 Medicine -Said to be used "in special diseases and as a laxative in spicen and bisous disorders" (Alkinson) it is also given "in bile and worms" (Baden Powell) Dymock (in Mat Med W Ind , 879) remarks that the drug known as "base el-kits (Arab), tukm i-sarmak (Pers)," may be the seeds of "a kind of spinach some say that it is the bathua of Hindustan, which is Chenopodium album" It is "deobstruent and

dimenc" Special Opinion - 6 ' Considered laxative and recommended for use by Sanskrit writers in the form of pot herb in piles" (U C Dutt, Civil Medi-

cal Officer, Serampore) Food -Cultivated by the Hill tribes on the higher western Himalaya, and occasionally in other parts of India The wild plant is also regularly collected and eaten as a pot herb and green vegetable The spap of the cultivated plant is the principal product, but the leaves and twigs are also eaten as a spinach Atkinson (Him Districts p 697) says "it is entirely a rain crop and attains a height of six feet The seeds ripen in October

The plant is often injuriously present in the cold weather crops of the plans
Professor Ohurch (Food Grains of India) says the leaves of C album "are rich in mineral matters particularly in potash salts. They likewise contain a considerable amount of albumeno ds and of other compounds of nitrogen." The seeds are said to be superior to buck wheat

F00D Plant TOOK

DYE

Plant.

1004

MEDICINE.

1005

Seeds 1007

CHENOPODIUM Mexican Tea: The Jerusalem Oak. Botrys. Domestic Uses,-Baden Powell says that this plant is used in the DOMESTIC. Panjab "to clean copper vessels preparatory for tinning them" 1008 Chenopodium ambrosioides, Linn; Fl. Br. Ind., V., 4, 1000 THE SWEET-PIGWEED: MEXICAN TEA. Syn,-C VALPINUM, Wall, AMBRINA AMBROSIDIDES Vern,-Herba Santa Maria in Brazil In Chili this is known as Culen. References .- Dals. and Gibs , Bomb, Fl Suppl , 73; Bent. and Trim , Med Pl , 216. Wah tot _ Am and _ off _ dat course good ac me cum, from which it may be distinguished by having its flowers in leafy MEDICINE. Medicine.—This is said to afford an essential oil to which the tonic and antispasmodic properties of the plant are attributed. It is commonly TOIG reported that this plant is used as a substitute for the officinal C. anthelminiticum, having in a milder degree the anthelminitic properties of that plant. It is employed in pectoral complaints and enjoys the European reputation as a useful remedy in nervous affections, particularly chorea Officinal preparation an infusion. various species not being distinguished. Food .- This plant affords the Mexican tea. FOOD. TOLL C. Blitum, Hook. f. ; Fl. Br. Ind , V , 5 1012 Syn .- BLITUM VIRGATUM, Linn Vern .- Sundar (J ), kupald (C), PB References .- Stewart, Pb Pl , 177; Von Mueller, Extra-Tropical Plants. Habitat .- North Western India: Kashmir, altitude 8,500 feet and Western Tibet at 12,000 to 14,000 feet Stewart found the plant wild in the Jhelam, Chenab, and Ravi basins and in the Trans-Indus at altitudes fror DYE. 1013 Fruit. IOI4 resembles. In Ladal, the LEAVES are caten as a pot-herb." Leaves

1015 ioiç

C. Botrys, Linn.; Fl. Br. Ind., V., 4

THE JERUSALEM OAK.

Syn.-C. ILICITOLIUM, Griff Notul, IV. 337 References.-Dals & Gibs, Bomb Fl. Suppl, 73

Habitat .- Temperate Himálayas from Kashmír to Sikkim, at altitudes from 4,000 to 10,000 feet. Tibet 11,000 to 14,000 feet. Stewart says it occurs at Peshawar, and Dalzell that it was originally introduced into

Bombay but has now gone wild. A weed of fields, Medicine. - Reported to be used as a subset to for C pottatone and to possess the same pt
U. S. Dispensatory it has be-

and humoral aethma. The

EDICINE. 1017

CHICKRASSIA tabularis.

The Oninoa: The Chittagong Wood

2018

Chenopodium murale, Linn, Fl Br. Ind, V, 4

Vern -Bátú, kuránd, kharatua, PB References -Stewart, Pb Pl., 178

FOOD IOIO 1020

Habitat -General in many parts of India from the Panjab to the Gangetic Valley, the Deccan, and South India Food -Used as a pot-herb in the Panjab

C Quinoa, an American species, has once or twice been tried in India, but apparently with little success (See Church, Food Grains of India, p 110)

Cherry, see Prunus Cerasus, Linn., Rosacez.

Chestnut, Horse, see Æsculus indica, Colebr (A 567), and Æ Hippocastanum, Linn (A. 573); SAPINDACEÆ

Chestnut, Sweet, see Castanea vulgaris, Lam , Curulifere

Chestnut, Water, see Trapa bispinosa, Roxb, and T. nutans, Linn, ONAGRACEÆ

CHICKRASSIA, A Juss , Gen Pl, I, 339

1021

Chickrassia tabularis, Adr Juss; Fl Br Ind, 1, 568, Beddome, Fl Sylvat, t 9, MELIACEE

THE CHITTAGONG WOOD

Syn -SWIETENIA CHICKRASSIA Rorb, Fl Ind, Ed CBC, 370, C

Sym.—Swietenia Chickrassia Roob, Fl. 1111, ea. ea. ea., air, .
Niismosii, Grad. Dale Ge Coh., Bomb Fl., 38
Vern.—Chibrassi, pabba, dalmara Beng., Boga poma, Ass., Pabba
pubha, Boun., Fabba palara, nai, Alar, Agloy, oral, agle marum
eleukiaray, Tax., Madagarı semba, chitigong chetin. chiliqong
karrı, cheta kum karra, Tel., Deredah, Mala., Gunis malis, Salka,
Dalmara I ali, deredari, Kan., Jahis, Ilipirkaba, Saghra, yunuma nga
barasi, Nicoli, Chegarasi, Charlin, Timmah, yeng ma yunuma nga

Burm , I 227 Gamble, Dals & Gibs Bomb nezsy, Beng Dispens, resins, 13 Atkinson,

Him Dist, 814 Birdwood, Bomb Prod, 325 Lisboa, U P! Bomb, 45 . Balfour, Cyclop , Treasury of Botany , Kem Cat , 29 Habitat.-A large tree, native of the hills of Eastern Bengul, South

India, and Burma, and also found in the warmer parts of Ceylon Gum -It yields a transparent, amber-coloured gum, said to have been

cent from Madura to the Indian Museum in 1873 (Spons' Encycl) The light brown, some-Gum resins, 13)

ugh not bitter from yellowish brown ins and works well,

40 to 52lb per cubic foot. The wood is used for furniture alia to gong wood of commerce, and from its fresh cedar-like smell is called lal or derdars in Kanara The wood is dark-coloured and close in the grain It is used for every purpose, and is much valued" (flomb Gas, XV, 66) "The wood is well known in Madras and easily procured, and is extensively used in cabinet-making, coming under the denomination of

C. 1025

GUM 1022

DYE. Flowers. 1023 MEDICINE. Bark. 1024 TIMBER. 1025

# The Chittagong Wood: Chlorophytam. CHLOR brev Chittagong wood, being imported from that district, though it is

CHLOROPHYTUM breviscapum.

abundant in the mountainous parts of the peninsula. It is close-grained. light-coloured, and delicately seined, makes beautiful and light furniture. but is ant to warp during the season of hot land-winds. According to Dr. Gibson, it is a fine straight-growing tree, rather common in the southern boo z nurno plane Malabar. It is found also in I and on the Ghats, particularly but tough and close-grained, known to the carpenter. It (Balfour, Cyclob.) Chicory, see Cichorium Intybus, Linn.; Composita. China Root, see Smilax china, L. : LILIACEE Choinanthus albidifiora, Thw. see Lineciera albidiflora, Thw. C. zevlanica, Linn, sec Linociera purpuren, Vahl. , OLFACER. Chiréta, see Swertia Chirata, Ham. : GENTIANACER Chloride of Ammonium, see Ammonium chloride. Chloride of sodium, see Sodium chloride. CHLORIS, Sw. : Gen. Pl . III . 116c. Chloris barbata, Swartz , Duthie, Todder Grasses, 52 : GRAMINER. 1026 Syn. -Andropogon Barbatus. Linh Vetn Gank, gaung, paluah, jargi, londa-pulla, N.W. P.; Ganni, sharna. Pa, Phundi, Ajuirg, l'ernit, Merwara, Chhinkel, Jeveng, Berdya, phulha. C. P.; Bodya sharo, Berae; Aonda-pulla, South Isban, Mayi konda-pulla, Tan References. 371 , Dals & Murray, Pl Habitat -Very in large tufts Fødder.which they do roppest. not seem to to 1027 IMIR; Mathaniya, LAITTIUR: toott ass, not uncommon in Northern C. tenella, Roxb., Kagya, Ajuir, Morbhaga, Unairur; a reass common in Rajputana, Bundelkhand, and Central Provinces, is also consider. ed good fodder. CHLOROPHYTUM, Ker. ; Gen. Pl., 111., 788. 1020 Chlorophytum breviscapum, Dalz. in Kaw Journ, 11., 142. LILIACIA. Vern. — Bimbál, Sing References. - Dale & Gibt. Fomb. Fl. 252; Thmalles, Fn. Ceylon II. 339; Baker, Lunn Soc., XV., 331; Treasury of Bolany, 11, 1280. Habitat.-Frequent in the Malwan District, Bombay, in rocky Isitu-

ations C. Heynei, Paker, a nearly allied species, met with in the southern

and central parts of Ceylon, at no great elevation

CHLOROXYLON Swietenia

## The Indian Satin-wood

MEDICINE. Bulb 1030

Medicine -Used medicinally by the Singhalese (Thwaites, En Ceylon Pl , 739) There are several other species of this genus met with in India, and it seems probable their medicinal properties have been everlooked C. taberosum is general throughout India, from Bombay to Prome, ascending the Himilaya to 3,000 feet in altitude C. nepalensis occurs in the eastern sub-tropical Himilays, while C. arendinaceum occurs on the sub-tropical Himaliya and on Parisnuth in Behar, altitude 4,000 feet

1031

CUM

1032

CHLOROXYLON, DC , Gen Pl, 1, 340 Chloroxylon Swietenia, DC, FI Br Ind, I, 569, Beld, FI S.I. vat, t 11; Wight, Ic, t 56, MELIACER.

THE INDIAY SITTY-WOOD

Syn -Swiftenia Chloroxylon, Roxb , Fl Int , Ed C B C , 370 Vern —Dhoura, Bhirra, girya, Hind , Behru, biluga, bhayri, bheyri, Univa, Behra, girya, behru, bihri, bhirra bihra C P, Sengel sali, Kol., Bharbáf, Kanwan, Bhira Gond Bhirm, Brigas, Hulda bilitá, hardi, bheria, Hong ; Halda, bheria, Mir , Shadadad, burus, burkismu tudad marum, purus burus, pummray, mi tuda, pummaai pora-

burute, Stha

Weller, Sacon Brondits, For Fl, 72, Gamble, Man Tinh, 77 Thunites, Ed. Colon Pt. of Dale & Gob. Bomb Fl. 39 Neigh Hot Sto. Col. (27) Dymock, Mai Mel W Ind, and Ed., 177, Drary, U. Pt., 131 Cooke, Gunsy and Gom resun, 25, 15, Alkinson Guns and Gun resun, 34, Alkinson, Him Dist, 814 Lisbon, U. Pt. Bomb, 45 Bat four, Cyclog Treasury of Belany, Ker Cat, 29

Habitat,-A moderate sized, deciduous tree, found in Central and South India, and Ceylon Common in the forests of the Konkan, Deccan,

and Coromandel, flower in March

Gum.-"Satin wood gum was contributed by Dr Cleghorn to the Madras Exhibition of 1855 The specimen in the collection from Salem (1873) referred to this source is in

tears, very variable in size, brittle,

lucent, brown, somewhat resemble ble in water, tasteless or slightly

mahogany colour, with an odout as or insu ou IL Was a pecular and remarkable phenomenon which the mucilage of this sample exhibited, in that its surface was in an hour or two covered by a thick pellicle of gum, the upper surface of which became quite dry, as if, by rapid evaporation of the water in which it was dissolved, it was returned to the solid state Although this pellicle was broken up, it continued daily to re form on the

surface of the solution "Another sample in the reference collection is from Ceylon, paler in colour and in definite, rounded, shining, amber-colouted tears" (Cooke,

1033 DIL 1034 MEDICINE Bark 1035 Leaves

DYE

1036 Timber

1037

ribed sometimes by Hindu 1 to 8}

unere ħt

56th per cubic foot

## Garden Chrysanthemums.

## CHRYSANTHEMUM.

It is durable and excellent for turning; used for agricultural imple- SATIN-WOOD. ments, cart-building, furniture, and picture-frames. It is, however, very In Madras it is liable * prized · · · , of gun-carriage wheels, s been tried as a substitute for boxwood in engraving, but has not been found suitable. is imported into England for cabinet-work and the backs of brushes. in Dimonto and a the a and a not and and all made an

as it merits. The market is at present glutted with an over-supply, and the brokers, who were selling wood twelve to fifteen months ago at £20 a ton, cannot now get 66. In Ceylon, satin wood is used for building, of 8 to :

Lotties o district

kotties part of the satin-wood cut is exported to Madras, where it is used for furniture and general building purposes" (Indian Forester, X., 1. 38).

Chocolate nut and bean, see Theobroma Cacao, Linn, STERCULIACEE

CHONEMORPHA, Don; Gen. Pl., II, 720.

Chonemorpha macrophylla, G. Don; Fl Br. Ind., III, 661.

[ Wight, Ic , t. 432; APOCYNACEE. Syn. - Denites MACROPHYLLA. Royb. Fl Ind. Ed CBC. 25.

Vern - Garbadero, HIND , Yokchounrik, LEPCHA, Harks, SYLHET. References - Brandis, For Fl., 329; Kurs, For Fl. Burm, II, 187, Gamble, Man. Timb, 291, Dals & Gibs, Bomb. Fl., 149, Vorgt, Hort Sub Cal, 523, Balfour, Cyclop

Habitat .- A large climber with milky sap, met with in North and East Dancal and D and

> labarica) "the leaves of irbuncles, and the roots seed." The Flora of

British India alludes to that plant as a doubtful species

Chowlf, or Chaulf, see Vigna Catiang, Endl , LEGUMINOSE.

CHROMIUM AND CHROMITE.

The metal Chromium occurs to a limited extent in India in the form of chrome other (chromite) in Salem in Madras and Spiti and Kashmir in the D - IL TT

such as in the

٠.,

is the v information see Ball's Econ Geology, 332, Mallet, Mineralogy, 53, Balfour's Cycl., 717.

CHRYSANTHEMUM, Linn; Gen. Pl, II, 424.

There are three wild species belonging to this genus met with in Western Thibet and one in upper Sikkim—all alpine in their character, never occurring below 9,000 feet. The Chrysanthemums of Indian phar-The Chrysanthemums of Indian pharmacy are the two garden species

1038

GUM IO30 MEDICINE. 1040

1041

1042

CHRYSANTHEMUM indicum.

The Common Garden Chrysanthernum.

1043

Chrysanthemum coronarium, Linn ; Fl Br. Ind , III , 314; Bot CHRYSANTHEMUM Mag , f. 1521 / COMPOSITE.

Syn -C Roxauroun, Deef , Pyrryurin indicum, Roeb, Fl. Ind., Fd , C B C , tog; MATRICARIA OLFRACES, Ham in Wall , Cat , 3270

Vem —Gil-chini, Ityno, Dec.; Akur kurra, gil diuda, Ityno; Gil-dandi, Drvo; Putko garkah Ars.; Zenti, Laganr, Po; Ka'ian; LADAK; Socti, Rous; Turisjani, gulisteracii, Mas.; Gildidadi, Gov., Sakmanippi, Tan; Cakmani, Its.; Ilale, han; Skicantidi cheredramalika, stunti, sameni, Sans; Gil-dadud, Pirs; Lawilkega, Sino Gil-chini is also applied to Plumiera acutifolia, Foret, Aro-CYNACER.

References -Dals. & Gibt, Bomb Fl. Supp., 48; Anthyson, Cat Pb. Pl., 77; Pharm Ind., 137; Mondern Shreiff, Supp. Pharm Ind., 29, Dymock, Mat Med W. Ind., 371; Moraray, Pl. and Drugs, Sud, 183, S. Arjun, Bomb Drugs, 79; Drury, U. Pl., 133; Balfour, Cyclop.

Habitat .- A native of the Mediterranean region, only known in India under cultivation as an ornamental garden plant. There are several very distinct varieties, some large, others small flowered, and white, yellow, or orange coloured The foliage also varies considerably, some forms having large and coarse, others small leaves. Two of the coarser forms seem almost naturalised in India, and to such an extent that Roxburgh viewed them as "natives of Bengal"

MEDICINE. Flowers. TO44 Root 1045

Medicine .- "The PLOWERS are stated by Dalzell and Gibson to form a tolerable substitute for Chamomile for medicinal purposes. The ROOT, chewed, communicates the same tingling sensation to the tongue as pellitory, and might doubtless be used as a substitute for it. The people of the Decen administer the plant, in conjunction with black pepper, in gonorrheea (Dr Walker, Bombay Med. Phys Trans, 1840, p 21)" (Pharm Ind)

"Akur kurra is a drug commonly used for toothache, and assigned by Jameson to Spilanthes oleracea. (In Flora of British India, S Acmella, Linn, var. oleracea, Clarke, Roxb, Fl Ind., III., 40) "It is probably derived from different plants in different places." It is prescribed largely in infusion, in conjunction with the lesser galangal and ginger, by native practitioners, and by itself in European practice, for colic, hysterical affections, pain in the head, and lethargic complaints, also in typhus fever. In paralysis of the tongue it has been used as a local application with advantage, also in apoplexy, chronic ophthalmia, and rheumatic affections of the face By the Persians it is considered discutient and attenuant, and according to Celsus it was an ingredient in the famous cataplasm which, in his time, was employed as a resolvent and for maturing pus, also as an agent for opening the mouths of wounds" (Murray, Plants and Drugs

Garlands. 2046

Sacred Uses -"The beautiful yellow leagrant flowers of this plant are made into garlands and offered at the shrines of Vishnu and Siva ' (Balfour)

1047

C indicum, Linn , Fl Br Ind , III , 314; Bot Mag , 1 327, 2042, THE COMMON GARDEN CHRYSANTHEMUM OF INDIA. [2556

Syn -- Pyrethrum indicum, DC Prodr., VI, 62, Chrysanthemun indicum Willd in Roed, Fl Ind, Ed, C B C, 604 Vern -Gul daud, Hind, a name applied, according to Roxburgh, totall the varieties , Gendi, bagaur (genda is the Hindustani for Tagetes erecta), PR , Kalsang, LADAK , Chevatt, akurkura, Boms , Shevati, MAR.; Akkara carum, TAM , Chamunti, Tel

#### Chrysanthemum Fodder Grasses

CHRYSOPOGON acıculatus

References — Roxb, Fl Ind, Ed C B C, 604 Clarke, Compositæ Ind, 146, Dals & Glos, Bomb Fl Supp, 48 Stewart, Pb Pl, 124, S Arjun, Bomb Drugs, 192, Baden Powell, Pb Pr, 358, Birdwood Bomb Prod . 50

Habitat -Commonly cultivated in Indian gardens, and is in fact only

MEDICINE. Flowers 1048

natives heating and aperient, and useful in affections of the brain and calculus, and also to remove depression of spirits. Drury says the "natives of the Deccan administer the plant, in conjunction with black pepper, in gonorrhœa"

Sacred Uses -The flower heads are sacred to Vishnu and Siva

Garlands 1040

CHRYSOPHYLLUM, Linn, Gen Pl, II, 653

Chrysophyllum Roxburghu, G Don, Fl Br Ind, III, 535; Bedd . Fl Sylv , 1 236 , MELIACEE

1050

THE STAR APPLE

Thwasies En Ceylon Pl., 174 Dals & Gibs, Bomb Fl. 138, Voigt, Hort Sub Cal, 340, Lisboa, U. Pl. Bomb, 88, Balfour, Cyclop

Habitat -An evergreen itree of Bengal, Burma, the Western Ghats, and Ceylon

Food -Fruit edible Roxburgh says "The fruit ripens in October, and is greedily eaten by the natives, though to me the taste is by no means agreeable the pulp being almost insipid, and, though tolerably firm,

FOOD Fruit 1051 TIMBER

1052

1053

- 25 (wome dus, it, p. 1,00)

CHRYSOPOGON, Trin Gen Pl , III , 1135

Chrysopogon aciculatus, Trin , Duthie, Fodder Grass, 30, GRAMINEZ Syn -Andropogon aciculatus Linn ( Rets); Roxb, Fl Ind , Ed

CBC 68 A ACICULARIS Aunth

Habitat.—A small, coarse grass, growing on barren, moist pasture ground throughout Bengal, also in the North-West Provinces, Central Provinces, and in the warmer parts of Ceylon Along with Cyperus rotundus and Imperata arundinacea this constitutes the characteristic turf

Fodder —Cattle do not seem to l'ke it. Its thin, straight culms, 1 to 2 feet high, flower, and the small spikelets of awned barbed, fruits which follow, are troublesome to those who wak through the grass, as they stick

FODDER. 1054

Fodder Grasses: The Common Gram

CICER

arietinum.

to the stockings and produce until removed a pricking and itching As soon as the spikelets appear cattle refuse to eat the grass 1095 Chrysopogon coruleus, New Duthie, Fodder Granis, p 39 Syn -Ruspins Conules, Ners Vern - Dhanlian, Po ; Khar, SALT RANGE, Dhaula, SIWALIK RANGE, Chreia, LUMAON, Tigri, BUNDELKHAND, Palla pagrar gadi, CHINDS Thingra ka jhara, thill, Benny Habitat .- A common grass on the hilly tracts of Northern Inda, usually on stony or sandy soils FODDER. Fodder -On the Smalik range it is extensively used as fodder 1056 C gryllus, Trin ; Duthie, Fodder Graster, 40 1057 Syn -C Rolleanum, Aces , Andropogon Gryllus, Linn Reference -Astrhison, Cat Pb P1, 175 Habitat.-The plains and hills of the Panish and N.W. Provinces FODDER. Fodder -- Mueller says it is a useful fodder grass in Australia 1058 C. montanus, Trin , Duthie, Folder Grasses, p 40. 1059 Syn, -C PARAFFLORUS, Ben'h , ANDROPOGON MONTANES, Rand Vern .- Ballak Raj Habitat -The hilly parts of Northern India (Mount Abu) FODDER. Fodder,-In Rapputana it is said to be viewed as excellent fodder, 2060 and the grain is also sometimes collected and eaten by the natives Cicca disticha, Linn, see Phyllanthus distichus, Euphormacen Cicendia hyssopifolia, IV & A, see Enicostema_littorale, Blume, GENTINGEE. CICER, Linn , Gen Pl , I , 524 TOOT Cicer arietinum, Linn , Fl Br Ind , II , 176 , Wight, Ic , 1 20 (Leguminosæ THE COMMON GRAM OR CHICK PEN, CECE, II, GRENINGOS, SO Vern —Chold both, but Idias, Beno, Chana, chunna Hino But, Santali, Channa cholo, Pen, Chold chand Raputana, Chana Acobers Bond, Chemon, Dine, Kadil Karnatick, Chafina, chano Sind Chania, chans Guy, Harbara, Mar Kaddair, Tam, Sanner galu, harumandhabun, Tel. Audoly Kempu Ladair, Lari India, Kan, Humes, Araa, Nahad, Pers, Chanaka chemisto, Suks, Kan, Humes, Araa, Nahad, Pers, Chanaka chemisto, Suks,

aga pulusu, shanagakadi

Stewart, 10 1. 63 t Pl 323, Josep Hort if Supp Pharm Ind Mat Med W Ind, 2nd gs and Pl, Sind 120, Powell Pb Prod, 247, ood, Bomb Prod 293 ller, Field and Garden uro of Bolany Kew

Habitat

especially in the northern provinces
This is the Cicer of the Romans, and the purched seed, as an article
of food with the poor, is alluded to by Horace (Cicer frictum)
It is also

or Chick Pea.

CICER arietinum.

HISTORY.

CULTIVA-

N-W, P.

Large 1002

Small

1063

Cabult

1061

the ep-eBivBos of Dioscorides. The botanical specific name on es its origin to a not altogether fanciful resemblance of the seed, when first forming in the pod, to a ram's head (the krios of the Greeks). The English name "gram" is applied to a totally different product in the Madras Presidency, 

33). In Madras I'. Phaseolus Mungo b

"Bengal gram. where the word "gram" is exclusively given to the pea of Cicer.

History.-The chick-pea was thus known to the Greeks in Homer's time under the name Erebinthos, and to the Romans as Cicer, and the existence of other widely different names shows that it was early known and perhaps indigenous to the south-east of Europe. It is supposed that the chick-pea has been cultivated in Egypt from the very earliest times of the Christian era, and was perhaps considered common or unclean, like the bean and the lentil. But it is most likely that the pea was introduced into Egypt as well as amongst the Jews from Greece or Italy. Its introduction into India is of more early date, for there is a Sanskrit name and several other names in modern Indian languages. "The Western

from Persia to Greece, and the species now exists only in cultivated ground, where we do not know whether it springs from a stock originally wild or from cultivated plants." (DC., Orig. Cult. Pl.)

#### CULTIVATION.

N.-W. Provinces -The varieties grown in the North-Western Pro-· ' the former of a · · are also a black-

Gram is grown

- and barley. area under cultivation in the temporarily-settled districts is estimated at about 42 lakks of acres. It is sown from the middle of September to the middle of October at the rate of 80 to toolb to the acre, generally in a soil which lay fallow during the preceding kharif; the crop is gathered in March, April, and May. The soil for gram varies from the heaviest clay to the lightest loam, but it is found to prefer the former. It does not require so fine tillage as wheat and barley do, nor much

Ploughing (four times) . Seed (Sutt)

DOWING Reaping Threshing Clcan ng Rent .

> GRAND TOTAL . 12 13

-,0	Dillionary of the Economic
CICER arietinum	The Common Gram
CULTIVA-	The approximate average outturn for unirrigated land in the several
C. P 1005	divisions varies from 5 to 8 maunds per acre in the case of gram, and from 6 to 9 maunds in the case of gram barley and gram-wheat For irrigated land the outturn is estimated at 12 maunds for gram-alore, 14 for gram-barley, and 13 for gram-wheat.  The Central Provinces.—I of the principal rabi (winter) c ber and harvested in March rimental harvestings were mac est return was in Marsinghipur, where 873lb to the acre were obtained, est return was in Marsinghipur, where 873lb to the acre were obtained.
EOMBAY.	and the lowest, 237lb, in Chanda Taking the mean of all the returns in the eleven districts the yield may be expressed at 557lb. In the Chanda Settlement Report, it is stated that two kinds of gramare grown—the grey and the white. It is remarked that gram is not a popular crop in the Wardah District.  Bombay.—There are 602,205 acres under this pulse, and in Sind
Large 100G Small	34,166 acres The crop experiments made in the Bombhy Presidency reveal the following resulte: In Kaira District a large form of gram gave 738h to the acre, the total value of the crop having been R14-15-6, the 13ecs.
1007	ment being 31:38 per cent on the return. In this experiment 5410 of seed were given to the acre, and the remark is made that it was a dry manufe.
	as 750B the value na field
	that had been manured for maze. As much as 985th are assorecorded as mentioned be found
Kills weeds. Improves so i	Bomkay, 1 the soft 14ve some-
	thing to say to the very general association of gram and whent or gram and barley grown on the same field. The idea that it does improve the soil is one well worthy of careful scientific investigation. Such examples as the associated cultivation of tomatos in protecting cubhage
Jeniffeathm et mixed erops	and caulif mer from the arracks of catery flars are well known to the gradener, and it is possible the association of this pulse with cereal crops is tasted up in established experimental results of a more sound character than that hiterto advanced,—a saferuard against. Fillure, one error succeeding should the other fill. With this as a possibility it would seem unwise to discourage the city of efform the gracine of such misted crops.
Wheat and	we like point here in sed his been disposed of The gram crop rigers he here he when, and the admixture of the pra with what is not only or mighter leftly burgets merchants is the consequence of each of the second of the here of the second of the here of the second of the here of th
1	come of him heavehes not vena to the metric and become of me the metric and become of me the metric and become of the mean that he me the me t
† *	the state primary of the state
	Les etas as.

or Chick Pea.	CICER arietinum.
Of Poona it is stated that the chana or harbhara (gram) is the most largely grown of all the pulses, but chiefly in the east of the district, it requires good black soil and is sown in November without either water or manure and is harvested in February The leaves are said to be used	110N.
March It is stated to be admirably suited for cultivation on new lands of the land of the	
paratory crop for Sorghum vulgare and cotton "It certainly checks weeds. But it as certainly benefits the land in other ways also, which are not yet satisfactorily known. The average are outturn is 560h." (Bomb. Gas., XXII., p. 169). "As it takes very little out of the soil and checks weeds, gram is grown more to clear the ground than for profit, the returns seldom more than covering the cost of tillage." (Bomb. Gas., XII., p. 151).  In the Panjab, as, indeed, in all wheat producing provinces, gram is causes the plant to spro	PANJAB 1072
frequently it is scattered broadcast after one imperfect ploughing of the soil. Rain in March to April causes the pods to be attacked by catter in the policy of the last is the rail of the posson white, the last is, however, rare it is known as Cabuli, black, and white, parches better, and yields a better dal than the others. Confectioners use it as it does not require to be petiled before use Gram is injured by lightning and rain. Of the Karnal District it is stated that the	Red IO/3 Black IO/4 White. IO/5 Cabuil IO/6

CICER

#### The Common Gram

CULTIVA-TION. gram grows best on the stiff soils but is exceedingly sensitive to frost. A green worm called spirit attacks the seed, especially if the Christmas rains are late. In Hosharpur it is believed a line of inseed around the gram field is supposed to protect the crop from the injurious to the gram crop. In Gurgron the people also believe lightning is injurious to the gram crop when in flower, in Guyranwala haves are very destructive to the gram crop. Of Dera Ismail Khan it is said gram fails altogether one year out of every three. In Muzaffurgath the young leaves are eaten as a vegetable, being known as phalf! I he pods are roasted and eaten under the name of antin and diadlir! Aimt, plural aman, is used in the north, diadri in the south. The word amin is said to take its origin from an expression in allusion to gram ripening first of the rable crops. The effect of gram improving the soil is known in Multan. "The crop is not only profitable, but it is also said to act as a manure and improve the land for the next Manyf crop."

Improves
soil

RAJPUTANA
1070
CENTRAL
INDIA

Phalli 1077 Amin 1078

In Rafputana and Central India, gram is also grown, and especially along with wheat. There is nothing, however, of a special nature to record

INDIA 1080 BENGAL Straw-coloured 1081 Kabuli 1082 Bengal.—Gram, except in the wheat producing districts, is not very extensively cultivated. The Director of Agriculture reports that "There are two varieties grown, vis., the straw coloured and the white, or Kabuil Gram requires a heavy soil, does best in the clay or wheat soil, can be grown in loam, but not in a sandy soil, comes after the kele paddy, a connecting link between the air paddy and the amin five or six ploughings suffice to prepare the land, fine pulcersation of the soil not being required."

"Gram may be sown alone or mred with wheat, in the first case seven sees and in the other five seers, to the bigha" The sowing time extends from the second week in October to the first week in November. "No after cultivation is required" Harvest time is, February to March, "Threshing is effected by beating with a stick or treading under bullock, feet. At the first beating or treading only the pods come out, the second and the third beating or treading gives the seed. The outturn is from 24"

eurma 1083

In Burma - Mason says gram is grown extensively by the Burmese GRAM AS A ROTATION WITH WHEAT -In a recent lecture, on Indian agriculture, delivered before the agricultural students of the Edinburgh University, Professor Wallace, while stating his opinion that wheat cultivation could not be greatly extended in this country, alluded to the beneficial effects of leguminous crops cultivated in rotation with wheat already been shown in the remarks under gram cultivation in the Bom bay Presidency, that this fact is fully recognised by the Indian cultivator The Professor anticipates a rumous reduction of pulse cultivation in India, but admits that although the scientific principle of a rotation of crops is not thoroughly understood by the Indian cultivator, the habit of cultivating pulses, and particularly gram, as a mixed crop with wheat, or in rotation It should be borne with wheat, in a measure meets this necessity in mind, however, that seasonal peculiarities force on the Indian farmer a rotation. He has at least two if not three crops every year—the rable and bharif, the former reaped in spring and the latter in autumn. The majority of the pulses belong to the latter crop and are thus cultivated in the season when wheat cannot be grown, and are on that account not likely to be senously displaced by an extended wheat cutivation the only legisminous crop that might suffer in this direction, and hence it seems desirable that as little as possible should be urged against the prictice of growing that pulse as a mixed crop with wheat or barley. from

or Chick Pea.

CICER arietinum.

the Society of Arts the writer took occasion to recommend the extended imended an importation of gram into England as an article of diet for horses. Throughout India it may safely he said gram is the said transite of th out India it may safely be said gram is the staple article of horse food. In Madras another pulse takes the place of gram, but horse diet in this country has always a much larger percentage of pulses in it than in Europe. The animals thrive admirably on such a diet, and the opinion may be advanced that where muscular strength is required a diet that contains a distinct and rational proportion of nitrogenous matter is a more wholesome one than the over-starch diet given in Europe. The writer stated in the paper all ded to a Chambell a horse det in the

consists excl nor so likely ture of some cent, and of to 70 7 per cc

the muscle-f which would a nutritious ar

of oats and Indian com to obtain the indispension necessary amount of albuminoids from an English diet, the animal has to eat a greatly

s a nerve disease, de-

😯 less than two diseases be called Principal which I believe to be

exists on the subject of cattle and cattle diseases in India, and in no instance is there the slightest allusion to gram as the cause of any disease. Indeed, anthrax would appear to occur far more frequently among cattle not fed on gram than among those that get a regular amount of that pulse in their diet. In the small Native State of Manipur, where gram is not grown, as food for cattle, anthrax or a closely allied disease, is a very common cause of death among the rice fed ponies The disease alluded to is in India attributed to a sudden and large supply of fresh grass after periods of scarcity—an annual occurrence due to the periodicity of the rains following a hot season when all grass is burned up. May it not be that the pulse viewed as "gram" by the above mentioned authorities was nor gram at all but the injurious seed of Lathyrus sativus, the properties of which, in causing paraly sis, are well known?

CICER arietinum.

## The Common Gram

These remarks regarding anthrax have, however, been made in this place mainly to prevent undue alarm, until Professor Wallace's suggestions regarding a possible connection between it and gram-feeding have been proved correct.

CHEMISTRY 1084

## CHEMICAL PROPERTIES OF GRAM.

Professor Oburch, in his Food-Grains of India, gives an interesting account of this pulse, but is in error in too prominently restricting the name gram to the forms of Phaseolas Mango. This is the case only in the Madras Presidency; throughout the rest of India the terms black and green gram are practically unknown, the word gram symplying the pulse Cicer artefunn, although the term horse-gram is sometimes applied to the pea of Dolichos highors. In Madras it might fairly well beat that name, since it takes the place of Cicer artefunn as a lood for horses. The Professor gives a valuable table as the result "of nine analyses of the unhusked peas and of four analyses of the peas from which the husk has been removed."

## "Composition of the CHICK-PEA.

#### IN 100 PARTS.

		*****					Husked,	With Husk	In t h Husked.
Water Albuminoid Starch Oil Fibre Ash	ls	:	:	:	:	:	 11 S 21'7 59 0 4 2 1 0 2'6*	11'2 19'5 53 & 46 78 3 +	Oz. Grs, 1 367 3 207 9 192 0 294 0 70 0 182

^{* 1°1} of Phosphoric Acid.

"The nutrient ratio in the unhusked peas is 1:33; the nutrient value is 84."

The unhusked peas are therefore more nutritious than the husked, and it may be concluded that the process of steeping them in water before being mixed with the oats or other cereal both softens the pea and removes being mixed with the oats and mud associated with the pulse. This is an importentially the dust and mud associated with the pulse.

having

a high reputation.

## TRADE AND PRICES.

Very little can be learned regarding the internal trade in gram. It is extensively eaten by the natives in every part of the country, and there have been dearly and the careful trade in the pulse. The targeth, or Cal-Lahore, among bay Presidency k. In Madras consideration.

C. 1085

TRADE.

1085

CICED as Chieb Das arietinum. TRADE.

The foreign trade is at present not very extensive. The following were the experts during the past five years !-

Cwt. 8.29,647 112.051 12.52.53 372 (0) 1591-84 11.00.700 314,905 0 28.849 1884-85 119,129 535-56 10.74.771 300.070 0.84.046 856-87

The exports in 1870 were only 23,171 cmt, valued at R94,900; but it

other. Prices -In a recent number of the publication issued by the Department of Finance and Commerce under the title of Prices and Wares in India," Mr. O Conor has published tables which afford perhaps the most trustworthy data for arriving at a knowledge of the price of gram, his figures represent seers (21b) to the rupee. Mr. O Conor's results of average prices may be thus summarised i-

PRICES. TORG

	1873 to '76	1877 to '80	111 1831 to '84	IV 1873 to '80.
Madras Bombay and Sind Bengal North-Vestern Provinces and	23 63	17 77	32'05	20 7
	17 06	11*47	18 45	14 27
	20 58	15 31	21'77	17 94
Oudh	26 61	18 35	24 53	22 48
	30 04	18 29	26 7	24 16
	31 02	18 1	27 25	24 56

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. pur or Circl alielinum, and includes (as perhaps do the above figures) pulses that have a lower value than the true gram to ma ha a sha be landed at a price con-

nd for horses' food Refer-

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some respe In the Costs

he price of gram varied conison of the year. It would be all these prices, but the follow-

1087 quotations, the prices being

CICER arietinum.

#### The Common Gram

PRICES.

seers to the rupee, in which of course a larger quantity for the sum mentioned nould mean cheapness and a less quantity dearness :--

Di	STRE	cts.			August 15th,	November 15th.	lebruary	May 15th.
Mandia Damoh . Sambalpur Wardha	:	:	:	:	45° 39° 15° 20	42° 27° 19 8 22°	40°,	40*

The difference between the prices at which the cultivators sell the produce of their fields to the dealers, at harvest time and at other periods throughout the year, is not as a rule very great, still the prices are a little more favourable after harvest. Gram being a rabi crop it is harvested from February and March to April, and a mean of the quotations for the Central Provinces gives the average price in May as 26'S seers to the rupce or 53'8fb for, say, 1s. 5d. at present rate of exchange.

BENGAL. 1088

Bengal is not a large gram-growing province, and it is accordingly dearer there than in most other parts of India. The Director of Agriculture, in his report for 1836, gives the price of gram at 21 seers to the rupee after harvest and 20 seers at other seasons. Taking a high exchange, these quantities would represent 48 to 40th for is. 5d.

BOMBAY. 1080

Bombay -The quotation has been given in one of the Crop Experiments of 60 seers to the tupee, or, at the rate of exchange adopted in the preceding estimates, 120 fb for 1s. 5d. It is probable, honever, that this figure is much too low, and that the average price in the Western Presidency bears a closer approximation to that given for the Central Provinces and Bengal.

PANJAR. 1000

Paniab-In the Labore district, according to the Gazetteer, gram is stated to be sold at 100lb to the rupce (= 11 5d.). In the Mooltan district, the average price for the past 20 years is given as bolb and in the Jhelam district for the past 44 years as from 68 to 110lb according to the various parts of the district

N. W. P. 1001

In the North-West Provinces gram is variously quoted in the Gazetteers ; thus, in Bulandshahr 26 seers; in Mecrut since 1850 to the present date it has ranged from 55 seers to 20, and in 1869 fell to 9} seers; in Muzaffarnagar since 1821 the price has varied from 70 seers the highest to 14 the lowest; in Budaun it is given at 30'8 seers; in Bijnor about the same; in Bareilly it is much more expensive, and in Gorakhpur gram is considerably dearer than wheat.

DYE. 1002

Dye .- The leaves are said to give indigo. This curious fact is known to the Chinese. The dye is allied to the Assam so-called green, obtained from Vigna Catiang, which see,

MEDICINE. Seeds 1023

Medicine. - In medicine the sreps are considered antibilious. The chief interest medicinally is, however, in the acto Liquip obtained by collecting the den-drops from the leaves. The fact that the drops of dew are thus chemically changed through contact with a living plant is a point of great botanical interest not at present fully understood. The liquid is found chemically to contain oxalic, acetic, and malic acids. This wine gar is mentioned by the old Sanskni writers as a useful astringent, which might with advantage be given in dyspepsia, indigestion, and costiveness.

Cram 7001

One of the earl est l'unpean writers who describes "Core Vinegar was the Po'sherplorer Dr. Hove, who spent the greater part of two 5214 in the Bumbay Presidency in 1737-53. His report was some 70 years

## or Chick Pea-

CICER arietinum.

afterwards published in the Records of the Bombay Government (xvr. 1855): at page 57 he says:—"On the road to Dowlat" (a village about

MEDICINE.

it becomes an acid, which they use instead of vinegar, and that it makes a pleasant beverage in the hot season, when mixed with water; as likewise they used it as an antidote for the venom of pernicious snakes, of which there is a great number in the wet season. I tasted the dew but found it of no particular taste, except rather softer than common water, as it precular to the dew." Further on at p. 63, he observes that the natives

a few days ago, which had necwise an eady acquired a mineral held, but not quite so powerful."

Sir George Birdwood gives in his Catalogue of the Bombay years ago, my munshi asked me

Or. Moodeen Sheriff gives an interesting account of the collection of this liquid. "A piece of tean cloth is ned to the end of a stack and the pulse crop is brushed with this in the early morning, so as to absorb the dew. This is then wrung out and preserved." "The genuine drug can only be obtained from persons who own fields of gram; what is sold by native druggists is dilute sulphure and slyghtly tinged with some colouring matter." It is useful in diarrhea and dysentery, and is given as a drink with water in sunstroke. The boiled leaves are applied as a poultie to sprains and dislocated limbs, The fresh juice of the leaves mixed with crude carbonate of potash is administered with success in dysepsia (S. Aryim, Bomb. Druga, p. 193). The nead liquid is employed as a refingerant in fever. It is much used in the Decan in the treatment of dysmenorthea; the fresh plant is put into hot water and the patient sits over the steam. Dr. Walker observes that this is another way of

wh but also, in cases of the set 
Special Opinions — "The liquid obtained from

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Chauser students, Nonkhally) "The sold in the bazars—is generally dilute Chana-amba. ugar" (Surgeon-Hajor W. Dymock,

"ugar" (Surgeon-Hajor W. Dymock,
ender leaves of nim in cases of teprosy.
The water in which it has been materiated is used as a remedy for bilious-

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CICER arietinum.

The Common Gram

PRICES

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								_
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C. 1094

BENGAL 1088

ROMBAY 1080

PANJAB 1000

NWP 1001

> DYE 1002

MEDICIYE Seeds 1003

Gram 1001

## or Chick Pea.

## CICER arietinum.

afterwards published in the Records of the Bombay Government (xvi.) MEDICINE. 1855): at page 57 he says:—"On the road to Doulat." (a village about

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Special Opinions.—§ "The '- '

sally chute Chana-amba.
Dymock,
s of leprosy.
for bilious.

CICER soongaricum.

MEDITINE. Chana-khar.  CHEMISTRY. 1095	ness" (Brigade Surgeon F. H. Thornton, B.A., M.B., Monghit). "The vinegar, which is known here as chain a knar, is used for enlarged spleen," (Surgent and Composition of the seeds, as a up of warm milk, give a professional catarrh, the seeds, as a up of warm milk, give are the seeds of the
}	
FOOD. 1006 1006 Parched Gram 1007 Ragout. 1008 Young plants. 1009 FODDER.	classes of natives parched gram (chabena) is much eaten. Masson informs us that in the Panjabit is made into bread, which was a favourite article of food with the Sikh sirdars. The natives also eat it hoiled in the form of ragout, seasoned with a little pepper or capsicum. The YOUNG PLANTS are established to the season of the pepper or capsicum. The YOUNG PLANTS are established to the season of the season
	Cicer Lens, Willd., see Errum Lens, Linn.
	C. soongaricum, Steph.; Fl. Br. Ind., II., 176.
1101	l
	Veru.—Tishá, jamáne, banyarts, sárri, serri, Po. Reletences.—Stemart, Po. Pl., 63; Murray, Druss and Pl. Sind, 120; Church, Food-grains of India, p. 131.
	Varkand, liber
	lions sent to INC
FOOD. Seeds.	Agri. Horticultural Society many years ago (naving usen first found in the
1102	grain is eaten by the people. The
Shoots.	by the Chinese, and a vinegal are often covered by a viscid exudation, with a strong aromatic odout.
	C. 1103

## The Wild or Indian Endire.

#### CICHORIUM Intybus.

Altehison states that in Lahaul shoots are used as a pot-herb, and that the peas are eaten there, as they are, both raw and cooked, in parts of Ladak" (Stewart, Pb Pl . 68 . Hinderson, Mission to Lark and)

## CICHORIUM, Linn. : Gen. Pl. II. 506.

Cichorium Endivia, Linn, Fl Br. Ind., III, 391; Confositz

THE GARDEN ENDINE

Vern .- Launi, Hind , Bons , Beng : Kathini tirai, TAM

References - Aura, For Fl Burm , 78 Adehison, Pb Pl , 81; DC , Origin of Cult Pl. 97, Dymock, Vat Med W Ind. 2nd Et; Lisboa,
Treasury of Bolany

red to be a native of ٢ Be this 18 it may, there lent food from a very early period by the Lgyptians, through whom the Greeks and Romans

Medicane .- "Endive is much valued by the hakims as a resolvent and cooling medicine, and is prescribed in bilious complaints much as taraxacum is with us The seeps are one of the four lesser cold seeds of old

East" (Dymock) The ROOT is priluge, given in 'mingus,' the the seed is used in sherbets"

as cory are mentioned by Ovid as forming part of a garden salad, and Pliny states that endive in his time twe by un F 1 it has been used in

fact that the manner by Gerarde in 1507, minren + little form L as 15

. .

. . . spling (treasury of Botany)

C Intybus, Linn ; Fl Br Ind , III , 391 , Composite

THE WILD OF INDIAN ENDIVE, CHICORY, OF SUCCORY

Vern.—Kasni Hind, Pers, Hindyba Arra, Kashini-ovra, Tam, Kasmi-ottulu, Tet, Hand gul, suchal kisn, Pa Kisani Gij References.—Brandis, For Fl 77 Kurs, For Fl Burm 77 Slewart, Pb Pl, 124 Attchison Pb Pl, 81 DC, Origin of Cull Pl of

Habitat -- North-West India, Kumaon, distributed westward to the Atlantic

§ "In the plains of the Panjab it is cultivated by natives as a pot-herb (sag), and may be an escape, truly wild at 4000 to 11,000 feet" (Surgeon-Major F E T Attchison, Simla)

C. 1108

LOI

MEDICINE. Seeds. 1105 Root 1106

FOOD.

1107

1108

# CICHORIUM Intybus.

# The Wild or Indian Endive.

HISTORY.

History.—"The wild perennial chicory, which is cultivated as a salad, as a vegetable, as fodder, and for its roots, which are used to mix with coffee, grows throughout Europe, except in Lapland, in Morocco and Algeria, from Eastern Europe to Afghanistán and Beluchistán, in the Panjáb and Kashmír, and from Russia to Lake Baikal in Siberia. The

CULTIVA-TION, 1109

that has been dug or acre. This is the way of France and in Lomb of France and in Lomb of France are in the sollows: Prepare the soil, by thorough

during March, 41b per dete, at about time men in terral a

set out in rows nine inches apart, and at six-nion incora a find plant in the rows. In either case, the land must be kept clean, and well a fer serion, ordinary attention will afterwards and profitable for five years at

symptoms of Linute, the course of cropping pursus 'sown or planted with chicory.

"In preparing the land for a root crop, deep ploughing is recommended; and the land for a root crop, deep ploughing is recoming will a cannot be coming up, generally five or six weeks from the time of sowing, the seed,

it is necessity that the land should be very clean, or the weeds (partiserver) and smother the young plants, erent districts, in the midland and week in May is considered best, for the root), many of the plants will run

runners, or trumpeters, and must

they will spoin the sam, son broadcast, but the preference is usually given to urilling, the crop being easily heed and cleaned. The rows are generally from nine to twelve inches apart, and about 3 or 4h of seed per acre is the quantity used. Most of the cultivators of chicory single out the plants so as to leave spaces between them in the rows, each about six or eight inches long; but there are many ho do not do this, fancying that four or five small plants produce more weight of root than one large plant. The expediency of this, however, is very questionable, as it does not allow of the land being nearly so well cleaned as when the practice of singling is adopted "(Merlen, Cyclop of Agr., 1, 457).

be care

Chicory and Coffee	CICHORIUN Intybus.
In India - Von Ittlania in stand to the	CULTIVA-
auctuive. It seems probable that the plant is also grown as a fodder is some parts of the Panjab plains, but although a large trade might easily	n [
a drug an	
Great Britain imports annually close upon 200,000 cwts of the root I to are imported from	
	**************************************
on of the seed is use on of the seed is use to the butter and use a count sulphrite of potash	d
mucilage, and some bitter extractive principle. An infusion of chicor- mixed with syrup causes a thickening of the liquid (Balfour)	<b>' }</b>
Special Opinions - 5" Used as a substitute for taraxacum" (Assistan Surgeon Nehal Sung Salam was "" the live	
in cases of A strong	g
infusion of p sus voniting " (Surgec " Muci	i-
used by nat Surgeon	
Bhuguan Dass, Karal Pinds). Food.—"The vound plant to accome to	FOOD.
(Ro du	1111
roa	
use an of the far	÷- (
with coffee	Chicory in
nouncing .	
coffee mix	
properties e of thos	
on the oth those of	
dandelion, tant use	<b>"</b> ∤
ture of ch ~ by many persons been viewer	
by many persons been viewed to grocer is ordered to sell the	<u>.</u> }
TOCET Tenures to do is to se	ו מ
may be anything he pleases to make it. The sale of chicors separate	"}
from coffee has been strongly recommended by Sir James Elphinstone "The root tastes at first sweetish and mucilaginous, and then very	
bitter: the bitterness is greater in summer than in spring. For over hundred years chicory has been used as a substitute for, and admixtur with, coffee. Inpreparing chicory, the roots are washed, cut into small	
pieces and kiln-dred, and then roasted and ground Roasted chicory	<i>i</i>
C. IIII	

CIMICIFUGA fætida

Chicory and Coffee: Black Snake Root.

FOOD.

contains a volatile empyreumatic oil, to which its aroma is due, and a bitter principle. It contains no calleine. Infused in boiling water it yields a drink allied in flavour and colour to coffee, it is largely used in Belgium. In some parts of Germany, the women are said to be regular chicory topers (Parry)" (Surgeon C J. H. Warden, Prof. of Chemistry, Medical College, Calculta)

The following extract, relating to the fact of the chicory roots being a new source of alcohol, was published in the Tropical Agriculturist of 1st

December 1882, page 495. also p 57 -

"According to Erfindungen und Erfahrungen, the celebrated coffee substitute, chicory, seems likely to become of importance as a source of alcohol The root contains an average of 24 per cent of substances easily convertible into sugar, and the alcohol obtained by its saccharification, fermentation, and distillation, is characterised by a pleasant aromatic taste and great purity "Cleurist and Diversist."

ADULTERA-TIONS. 1112 Adulterations—"Roasted chicory is extensively adulterated. To colour it, Venetian red and, perhaps, reddle are used. The former is sometimes mixed with the lard before this is introduced into the roasting machine; at other times it is added to the chicory during the process of grinding. Roasted pulse (peas, beans, and lupines), corn (rye and damaged wheat), roots (parsnips, carrots, and mangold wurzel), bark (oak-bark tan), nood-dust (logwood and mahogany dust), seeds (acorns and horse-chestnuts), the marc of coffee, coffee husks (called coffee-flights), burnt sugrit, baked bread, dog-biseuit and baked livers of horses and bulfocks (fl), are substances which are said to have been used for adulterating chicory. A mixture of roasted pulse (peas usually and Venetra red his been used under the name of Hambro' pouder for the same purpose" (Ure's Dict, Art and Brusyl') A recent examination of certain "coffee mixtures" revealed the fact that roasted cockroaches and non rust were employed as adulterants. (See Coffee arabice, Jara, Adulterant)

CIMICIFUGA, Linn ; Gen, Pl , I , 9.

1113

Cimicifuga fætida, Linn., Fl Br Ind , I., 30 ; RANUNCULACEZ.

Vera - Tiunti. Pa

References, Stewart, Ph Pl , 2, Treasury of Botany , Kew Oficial Guile to the Museum, 8.

Habitat - Found in the temperate Himálaya, from Bhután to Kash-

MEDICINE. Boot. 1114 mir; altitude 7,000 to 12,000 feet.

Medicine.—The ROOT is said to be poisonous. In Siberia it is used to drive away bugs and fleas. Under the name of a nearly allied plant (Actua spicata), the writer has already referred to this plant, and chiefly with the new of attracting attention to these useful but apparently neglected plants.

Garrod, in his Materia Medica, calls Cimicilaga racemosa, Lina, the Black Snake Root, and remucks that it is a remedy much used in America. He gives the dose of the incuture as 50 to 50 minims. He remuks "It is use is said to have been attended with much success in rheumain fever, in chorea, in lumbago, and in some forms of puerperal hypochondrians." The Pharmacographia gives the history of C racemosa. It was first made known to Europe in 1695, and was secuntically densited and named by Uninzus in his Materia Metica in 1749. It is 1833 it was introduced into medical practice in America, and to Fingland in 1850.

There seems every reason to expect that the Indian species, which d flers from C. racemosa only very alightly, will be found to possess all its med.

#### Cinchona Bark Black Snake Root

CINCHONA.

1115

MEDICINE. cinal virtues C racemosa is chiefly prescribed in the form of tincture, -- 1 and employed in rheu

and chronic bronchial been used to reduce

> shaped sections, with a thick brittle intains a resinous active principle Macrotin In its action this drug and colchicum on the other. It is

most useful in acute rheumatism, and a powder of the root is perhaps the best mode in which to give the drug in doses of 20 to 30 grains (Royle's Mat Med cd by Harley)
Special Opinion - § A poultice prepared of the fresh leaves is used

here, and said to be very useful in rheumatic affection of joints" (Surgeon C 7 W. Mendows, Burrisal)

# CINCHONA, Linn, Gen Pl, II, 32

Cinchona, Linn; RUBIACEE.

A section of the root

CINCHONA BARL, PERUVIAN BARL, JESUIT'S BARL, COUNTESS'S BARK, ECORCE DE QUINQUINA, Fr, CHINARINDE, Germ

References - 11- - 11. 11 Haward a Mon Tin 418 Ains Maodeen 335 70 U

i, sie 111m Dot , 230-40 , i w i , Li 111m Dot , 230-40 , i w i , Li 111m Dot , 230-40 , i

Creary Smith, Die, 110, Fr.
Arts, and Man 733, 411 hew kiports, 1877, 15, 1879, 13, 1860,
11 13 1881, 10 1883, 18 10 hew Off Guide to the Mus of E. Bot.
New Off Guide to Bot Gardens and Arboretum, 74, 78 Sm.
monds, Trop Arts, 18, 28

monds, Trop Agri , 35, 78 Dr King of Calcutts, and Mr Lawson of Madras, each contributed a listorical account of the Cinchona cultivation of India, in connection with the samples shown by them at the Colonial and Indian Exhibition held in London in 1856 The writer has availed it misell of these notes in

### Cinchona Bark.

compiling the present article, but has at the same time venified the historic and other facts by consulting the works enumerated above

Habitat -Dr King says "The trees producing the medicinal barks are all natives of tropical South America, where they are found in the dense forests of the mountainous regions of the western parts of that continent at a height of from 2 500 to 0,000 feet above the level of the sea, and in an equable but comparatively cool climate. The Cinchona producing region forms a crescentic zone which follows the contour of the coast line, but nowhere actually touches it, beginning at 10° N and extending to 20° S latitude The crescentic belt is nowhere much above a hundred miles in width, but its length (following its curve) is more than two thousand During its course, it passes through the territories of Venezuela, New Granada, Ecuador, Peru, and Bolivia"

"It must not be supposed that each of the medicinal species is to be found growing throughout the whole length of the zone just described, on the contrary, the distribution of the various species is very local, not only as regards latitude, but as regards elevation above the sea. The species found in the region between 10° N and the equator (the barks of New Granada) were described by Mutis in the last century, and more recently by Karsten in his Flora Colombia. Mutis' notes remained in manuscript until 1867, when Mr Olements Markham succeeded in unearthing and printing them, and both his notes and drawings have still more recently been published at Paris by M. Triana in his Nouvelles Etudes sur les Quinquinas The Cinchonas of the region between the line and 140 S (the barks of Ecuador and Northern Peru) were first examined by Ruiz and Pavon and a magnificient work founded on Pavon's specimens was published by Mr J E Howard in 1862, while those indigenous in the region from the fourteenth parallel of south latitude to the extremity of the zone in 20° S were described by M Weddell in his splendid monograph published at Paris in 1849"

HISTORY

#### HISTORY OF THE INTRODUCTION OF THE DRUG INTO EUROPE

"The introduction of the medicinal Cinchona bank to Europe was effected by the Countess of Chinchon, wife of a Spanish Viceroy of Peru This lady having been cured by its use of an attack of lever contracted while in that country, brought a quantity of the bark to Europe on her return from South America, about the year 1639 Jesuit missionaries appear also to have taken an active part in its introduction early names given to the medicine were Peruman or Fesut's bark, and Countess's powder Nothing, however, was known to science of the tree producing this bark until 1739, when La Condamine and Jussieu, mem bers of a French exploring expedition then in South America, obtained plants with the intention of sending them to the Jardin des Plantes at Paris, but the whole collection unfortunately perished in a storm at sea The first living Cinchonas ever near the mouth of the River Amazon seen in Europe were some Calisaya plants raised at the Jardin des Plantes from seeds collected by Dr. Weddell during his first journey to Bolivia in 1846 In 1742 Linnæus established the botanical genus Cinchona, a term which continues to be employed by the majority of botanists, although some writers (more particularly Mr O R Markham, CB) prefer the name Chinchona, as more accurately perpetuating that of the noble lady who introduced this invaluable remedy to Europe" (King)

HISTORY OF THE ALEALOIDS -"The most important and at the same time peculiar constituents of Cinchona barks are the alkalo ds

### History of the Alkaloids

CINCHONA BISTORY

enumerated in the foll ming table :-OF THE

Alkalori

Chemical compressions WHI S. O me formula.

Cinchon ne Cinchenil ne (quin I ne of many writers) with NO Durind no (conquining of Hesse) me formala Lalla Ni Oi Ounamine

"There are other cystallizable alkalo de, but they have no med cinal value so far as is yet known, and there is a non-crestallizable alkalo d which has febrifued power. These alkaloids exist in the bark in combination with certain organic acids called kinic, cincl of spine, and quincrie. Of the alkaloids above mentioned the most at at a

Although Cinchons barks have been

for the past two centuries it was not

several active principles to which they separate form. The first to be so separated were quinine and circhonine Outsiding was discovered in 1833 and cinchoniding not until 1847 Quinamine was discovered so recently as 1872 by Hesse in bark of C. successfra around in 611 m

to t of 4 to : for

> cers or the medicar services of the three Indian Presidencies bark still continues to be rated by the European quinine-makers in proportion to the percentage of quinine it contains, the other alkaloids being counted for little or nothing as marketable products. These unsaleable alkaloids have accordingly been accumulating in the hands of makers in Europe, and are purchaseable at a comparatively low price. Regarding

> woss, Music, and C. iancitolia, Mutis, are due to Karsten He ascertained that barks of one district were sometimes devoid of quinine, while those of the same species from a neighbouring locality yielded at to at present " Ac

of auille

percentage or analogus from 11 00 (of which o I ner cent

#### Cinchona Back.

-- of hut has at the same time verified the his----- above. · medicinal backs are found in the ern parts of that e the level of the ser, and in an equipment The Cinchonaproducing region forms a crescentic zone winch ... we the contour of the coast line, but nowhere actually touches it, beginning at 10° N. and extending to 20° S. latitude. The crescentic belt is nowhere much above a hundred miles in width, but its length (following its curve) is more than two thousand. During its course, it passes through the territories of Venezuela, New Granada, Ecuador, Peru, and Holivia." ". : " not he supposed that each of the medicinal species is to be '-- of the zone just described; on s species is very local, not only n above the sea. The species cently script ig and printing them; and won. cently been published at Paris by M Triana in iiis .. sur lés Quin . . . The Cinchon's of the region between the line and 14°S. fihe t V ... Peru) were first examined by Ruiz and P . . . ~ - 'r specimens was enous in the published by Mi . : ! . . . region from the fourteenth parallel of sou ': " extremity of the zone in 20° S. were described by M. Weddell in his splendid monograph published at Paris in 1849"

HISTORY.

# HISTORY OF THE INTRODUCTION OF THE DRUG

"The introduction of the medicinal Cinchona bark to Europe was effected by the Countees of Chinchon, who of a Spanish Viceroy of Peru This lady having been cured by its use of an attack of fever contracted while in that country, brought a quantity of the bark to Europe on her return from South America, about the year 1639. Jesust missionaries measured also to have taken an active part in its introduction. Hence the medicine were Peruvian or Jesust's bark, and never, was known to science of the tree heat Dondamine and Jussieu, mental to the contract of 
plants the whole collection area the mouth of the River Amazon.

Paris, but the whole collection near the mouth of the River Amazon.

The same of the River Amazon area to be bounded in the same of t

though some er the name to lady who

introduced this invaluable remedy to Europe

HISTORY OF THE ALKALOIDS -"The most important and at the same time peculiar constituents of Cinchona barks are the alkaloids

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#### History of the Alkaloids

CINCHONA. HISTORY OF THE ALKALOIDS.

enumers of in the fet in ng table !-Chemister of the Chrine ne Callingo Same (remala ( intimit or far t Calle St Or Same | emails r 1 m (cres Cally No O, 727-170

"There are offer casta" izable alkalo by but they have no med in al value so far as is get he wh, and there is a nen-crystalizable alkalo'd which has felitifical power. There a kalor is exist in the back in combination with certain organic acids called limit, cincle-tinnic, and quinceit. Of the alkalerds alone meets med the most salied is undoubtedly quenture. Although Cincheon banks have been employed in Furope as febrilages for the part two centuries it was not untlife year 1820 that any of the several notice principles to which they one the refficacy was of faired in a esparate form. The first to be so separated were quinine and circhonine. Quinidine was discovered in 1833 and circhonidine not until 1847 Outram ne was discovered so recently as 1922 by Hesse in lark of

C, seccirebra grown in Sikk m

"S on after the discovery of quinine, the sulphate of that alkaloid began to be used by the faculty as a medicine in cases where some preparation of 'back' was required, and gradually the new salt drove out of fashion to a very large extent the powder, finctures, and decections of bark which formerly enjoyed such reputation in medical practice. Until the discovery of quandine and cinchonidine, commercial sulphate of quinine consisted really of a mixture of the sulphates of all the Cinchona alkaloids, the outward appearance of these being al ke. With the separation of the new alkaloids, chemical tests for their recognition began to be inserted in the various P) remaceform, and pure quinine began to be insisted on in med cal practice. The other alkal ada fell therefore into unmerited neglect, and they ware a · · · , " th Phare ..... ". related. micefaia has now bee them by officers of the medical services of the three Indian Presidencies back still continues to be rated by the European quinine-makers in proportion to the percentage of quinine it contains, the other alkaloids being counted for little or nothing as marketable products. These unsaleable

devoid of quinine, while those of the same species from a neighbouring locality yielded 31 to 41 per cent. of sulphite of quinine.

"Another striking example is furnished by Do Vry in his examination of quills of C. officinalis grown at Ootacamund, which he found to vary in percentage of alkaloids from 11 96 (of which g't per cent, was quinine) down to less than a per cent. .

" Among the innumerable published analyses of Cinchona bark, there are a great number showing but a very small percentage of the useful principles, of which quinine, the most valuable of all, is not seldom altogether wanting. The highest yield, on the other hand, hitherto

### History of its Introduction Into India.

HISTORY OF THE ALKALOIDS observed, was obtained by Broughtonfrom a bark grown at Ootacamund.
This bark afforded not less than 131 per cent, of alkalouds, among which
quinine was predominant.
"The few facts just mentioned show that it is impossible to state even
any given bark.
Offered in the drug

quinine.

"As to Crown or Loxa bark, the Cortex Cinchona palida of pharmacy, its merits are, to say the least, very uncertain. On its first introduction

cent of alkaloids but a large amount of colouring matter. The out

cent. of alkaloids, but a large amount of colouring matter. The guill Red Bark of the Indian plantations is a much better drug, some of it yielding 5 to 10 per cent. of alkalouds, less than a third of which is guiline and a fourth cinchonidine, the remainder being cinchonine and sometimes also traces of quindine (conquirine).

"The variation in the amount of alkaloids relates not merely to their

total percentage, but also to the proportion which one bears to another.

Quantine and canchonine are of the most frequent occurrence; canchonine, and canchonine are of the most frequent occurrence; and, and in have manner and that

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HISTORY OF THE INTRODUCTION OF CINCHONA INTO INDIA.

in which Cinchon:
felled for its bark,
public or private fo
or re-planting. M

or re-planting. M increased, and, as a natural result, prices rose, and lears began to be entertained that the supply would ultimately fail. The British and Dutch Governments being, by reason of their tropical possessions, the largest consumers of Cinchona banks and of the alkaloids prepared from them, their attention began to be seriously attracted to the increasing price

and scarcity of the drug,"

nting and employment have been greatly durine. So greatly indeed has the consumption increased, and so little care has been bestowed upon

### History of its Introduction into India.

CINCHONA.

munity."			٠.				٠. ١	
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						•	•	
1	,	٠.	•	٠.				HISTORY OF THE
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inferred that Chinese tea plants might be cultivated in the Northern Him/dayas."

"Dr. Royle's recommendations, although approved of, were not at the time acted upon, but were allowed to remain in abeyance until 1859.

America for the purpose of exploring the Cinchona forests, and of

an of I:

the pr tained

> Dr. I. I nomson (his successor at the Calcutta Garden) again pressed the matter, as also did the late Dr. T. Anderson. The Medical Board supported the proposals of these officers in an elaborate minute. It was not, however, until 1858 that the despatch of a special agent to South

Linchonas) in the forests of Bolivia and Southern Peru, where alone it is to be found. He arranged that Mr. Pritchett should explore the grey bark forests of Huanaco and Humalies in Central Peru, and that Messrs. Spruce and Cross should collect the seeds of the red bark tree on the eastern slopes of Chimborazo, in the territory of Ecuador. Markham has narrated his adventures in an interesting volume in which he has, besides, collected much valuable information concerning the inhabitants and flora of regions he traversed. Landing at Islay in March 1860, Mr. Markham, accompanied by Mr. Weir (a practical gardener), proceeded inland in a north-easterly direction, crossed the two chains into which the Andes are there divided, and, after considerable hardship, arrived in one of the series of long valleys which stretch along the western slopes of the snowy range of Caravaya, and descended to the 201

#### CINCHONA.

# History of its Irtroduction into India

HISTORY OF THE INTRODUC-TION INTO INDIA great plain of western Braul. Mr. Markham penetrated this salley fealled Frimbopath to a point beyond that reached by the distinguished Irinch traveller, M. Weddelf, and by the Dutch Agent, M. Hasskarf; and, notwithstanding that his proceedings were pren sturely cut short by a fudure in his food supplies, he was successful in collecting 490 plants of Clinchona Calinaja and 32 of the less valuable species ovata and micrantha.

"Instead of sending these plants direct to India, Mr. Markham was compelled by his orders to take them to Ird's er? Panama, I ngland, the Mediterranean and the Red Sea, and thus to expose them to tear-shipments and alterations of temperature which ultimately ki led them all

"About the time Mr. Markham was exploring the sellow bark forcess of Southern Pera, Mr. Parthetti was collecting seeds and plants of the species producing gety bark in the forcets near Humano, in the northern part of the same territors, and was successful in bringing to Lima in the month of August a collection of seeds and half a mule-load of young plants of the three species C micrantha, penviana, and milea. The task of collecting see

Andes, and . .

sery of your

seyed sticly to indis by Mr. R. Gross. A quantity of seeds of this species was also collected and sent to indin by post. Mr. Gross was subsequently commissioned to precure seeds of the pale barks in the forest near Lova, and this commission he executed with great success. A third expedition to New Granads was made by the same collector with the object.

thin the supplied to the supplied that the supplied that the supplied to the s

ought 'serve essful

introduction of Cinchona into India and other British possessions, Government are largely indebted for advice, as well is for more active assistance, to Sir William and Sir Joseph Hooker, the illustrious botanists, father and son, with whose names the fame of the great national institution indebtified.

were sent to India Those of the grey mary 1861, and those of the red barks

# History of its Introduction into India.

CINCHONA.

two months later. In the month of December 1861, Dr. Anderson delivered over to Mr. Melver at Obtacamund the plants he had brought from the Cinchona plantation which the Dutch had just succeeded 'in establishing in Java. Dr. Anderson had been sent by the Government of India to visit these plantations, and by the courtesy of the Dutch authorities he was allowed to take away with lim 50 plants of Cinchona Calisaya, four plants of Inactionia, and 284 plants of Pahudana. On the 4th March 1862, Mr. Cross' collection of pale or crown bark seeds from Lova arrived, and the introduction of Cinchona to India became thus an accombished fact '(King).



South India.

Introduction into South India.—"The success of Cinchona succirubra and officinalis on the Nilgurs has been remarkable. Not only do the trees grow luxurantly, but their bark is richer in alkaloids than much of the Carlon lark incontrol from South America. The Government

Lawson.

**Encouraged by its success on the Nilgiris, Cinchona cultivation was ranges of the Madras Presidency. The coffee planters of Wynnaad put out a good many red bark trees on their estates, and these are found to grow well. In South Canara a small plantation was formed in 1869, at a place called Nagooli, above the Koloor Ghât, and at an elevation of 2,500 feet above the sea; but the experiment there was pronounced by the Madras Government as unlikely to be productive of useful fesults, and was abandoned. On the Mahendra Mountain, in the Ganjam district,

Madras Governm the Forest Depar the Nulla Mully

and the Government" (King),

perintendence of Mr. Oross, to England, and from thence they were transported through the Red Sea to India. Here 463 arrived in good condition. These were taken to the Nilgiri Hills, the district previously selected by Dr. Royle as that in which the different varieties would most probably thrive best. For the hardier kinds Mr. Markham selected a site near the top of Dodabetta, the highest rounded knoll of which is about 8,700 feet above the level of the sea, while for the more tender sorts he selected a tract of country about Naduvatam, a small Toda village which hes on the edge of the hills facing the west, and which ranges between 5,500 and 6,000 feet. The plants, on their arrival, were handed over to Mr. W. G. McIver, who, for some time previously, had beld the appointment of Superintendent of the Government Gardens at Otacamund, and it is to his care and saggeity that the rapid, enormous increase of the plants is due. Easy as it is now found to propagate and care the different kinds of Cinchona, it ought never to be forgetten that

CINCHONA Calisaya,

# The Yellow Bark of Commerce,

HISTORY OF THE INTRODUC-TION INTO

1117

taken up with great vigour by the very spirited planting community of that the most flag of the last that the most flag of the last that the last that the last the last the last too of the

# THE SPECIES OF CINCHONA.

There are between about to see that some doubt may species many forms the backs are obtained for the being will be will be

which are cultivated in India.

Cinchona Calisaya, Weddell; Rubiacem.

THE CALISAYA BARK OF YELLOW BARK Of COMMERCE, a term also applied to the bark of C. LEOGERIANA.

1875 he recommended that

mine.

Vern.—Bárak, Dec.; Shurappattar, T.M.; Tradop-patta, Tel. References.—Kew Reports, 1877, pp 14, 28, 1870, pp, 12, 13, 1880, pp. 11, 25, 32, 1881, 25; 1882, pp. 18, pp. 38; Trap. Agriculturis, 1883, 700.

Habitat.—A very variable tree, with a trunk twice as thick as a man's body when well grown. Cultivated in Sikkim at moderate elevations. Dr. King, in a report dated 1872, says; "This plant yields the yellow bark of commerce, and is a sort second to none in value; it promises to do well in Sikkim. From the difficulty of propagating this species artificially, the progress made hinterto has been slow." Since the above was written the cultivation of this species has been so successfully extended that it is at most only second to C. succlimbra in point of importance in the Sikkim plantations. In a Resolution of the Bengal Government dated March 1888, it is stated that Mr. Wood was of opinion that good quinine barks.

tion was not acted upon for some time. Full effect has, however, been given to it of recent year and the large has been supplanted by other hand, the been practically abandoned. Calisays to the category of the large has been supplanted by other hand, the been practically automate of Bolivia and the form natural of Bolivia and the form natural of the form natural o

sources is uncertain.

Medicine.—This yields one of the most valuable of the Cinchona barks, rich in alkaloids, among which quinine forms & to \$4. The mark and

ht).

1 this
bark: "Two varieties of Calistya bark are distinguished in commerce,
flat and quilled. Flat Calisaya bark is flat or nearly so. It is generally

C. 1120

MEDICINE.
Bark.
III8
Powder.
III9
Leaves.

The Ledgeriana Bark of Commerce.

CINCHONA Ledgeriana

Structure of the Wood.—Reddish-grey, moderately hard, even-grained.

Pores small, in short radial lines. Medullary rays fine, closely packed

TIMBER.

VARIETIES OF C. CALISAYA.

Numerous varieties and hy brids have been distinguished of this species, especially by Weddell. The best known are var. Josephiana (named after 1. degeriana; but C. zamba, te being experimentally Dr. Van Gorkum, the

Josephiana. II22 Zamba. II23 Morada II24 Verde. II25

Blanca

TT26

onsists mostly of C Calisaya, in which quintine is the chief alkaloid." "The Java Cinchona barks are celebrated in Europe for their superior outward appearance and isae been able to command a high price. I do not know how far that superior outward appearance may be dependent on the manner of harvesting, drying, and packing, but certain it is that their treatment is highly spoken of." "There are numerous varieties of C. Calisaya, but we possess one with which we have become acquainted, especially from the numerous analyses of Mr. Moens, and which produces a superior manufacturing bath."

superior manufacturing bark "
The variety known under cultivation as C. Ledgeriana may now be

separately alluded to

Cinchona Ledgeriana (a cultivated form).

1127

planters. It is, however, a small tree when compared with other kinds of Cinchonas, and consequently the amount of bark harvested in a given number of years is much smaller than that taken from other kinds. The bark also, when it is renewed, is less rich in quinne than the natural bark, so that the trees, instead of having their bark improved by the process of

CINCHONA officinalis

# Loxa or Crown Bark of Commerce

stripping, as is the case in the other kinds of Cinchona, decrease in value These two circumstances make it doubtful if plantations of C Ledgerlana will, in the long run, be much more profitable to the planter than those formed of the more robust kinds, although the bark of the latter may have a lower percentage of quinine "

During the Colonial and Indian Exhibition several Cinchona experts spoke in the highest terms of this plant. It was urged that its cultivation was certain to prove more remunerative than that of any other species It could be propagated at lower altitudes than the others (scarcely growing above 4 000 feet), and was, from this point alone, a more economical

2,500 feet this plant "To-English traveller,

een collected near Pelechuco, enstward of the lake littered, about 68° west longitude and 15° south latitude, in the Bolivian province of Canpolican. In the same or - - - 1/ sold to the Dutch , and a little later

( I edgeriana has since proved by far the most productive in quinine of all Cinchona barks tree is a mere form of C. Calisaya Mr Hooper, Quinologist to the Madras Government, in a recent report, remarks "In the Ledger bark it will be noticed that there is a stendy rise of quinine up to the age of between five and six years after which there is no apparent increase.

Cinchona carthagena (Commercial name)

This has been successfully introduced into the Nilgiri hills within the past few years, and Mr Lawson alludes to it in his reports. In - 'his valuable Cinchon's gain, in 1882 83, the

C. officinalis, Hook

LOYA OR CROWY BARK, the Pale Bark of Commerce

Syn -C CONDAMINEA, Humb Relevences - Year Book of Pharm., 1873 447 1875, 161 1878, 444

Habitat -- A native of Ecuador and Peru Cultivated at high eleva-Habitat —A nettive of benador and rend to the not extensively toos on the Nilgris, in Ceylon, and in Sikkim, but not extensively toos on the Nilgris, in Ceylon, and in Sikkim, but not extensively toos on the Nilgris, in Ceylon, and in Sikkim, but not extensively too to the new too.

a ' The altest

to be too moist by this species is quinine he Pharmacopœia similar in structure to that

of C Calisava Mr W Elborne describes the bark of this species -

"The bark breaks easily with a fracture which exhibits very short fibres in the inner side. The Lova bark of commerce is chiefly produced by on the inner side this species, though occasionally other species of Cinchona contribute to furnish it. At the present day it is scarcely possible to obtain genuine Lova or Crown bark from South America, India, Ceylon, and Jamaica being the chief sources of the bark in commerce

C. 1131

1128

1120

MEDICINE Loxa Bark 1130

TIMBER 1131

#### Red Bark of Commerce.

CINCHONA succirubra

cinchonine.

Cinchona succirubra, Pavon.

RED BARK.

References.— Year-Book of Pharm, 1873, 70-73, 447, 1874, 19-20, 150-154; 1875, 12, 159; Kew Report, 1877, 28.

Habitat .- Cultivated on the Nilgiris and other hills of South India; at the plantations of Rangbi and Poomong in Sikkim, on the hills east of Toungoo, in Burma, and in parts of the Satpura Range in Central India.

Mr. Lawson writes of South India, while speaking of C. officinalis: "The C. succirubra, on the other hand, has a bold sturdy stem, which, in rich soil and sheltered situations, grows to the height of 50 feet or more made up

nalis looks

on and areas 5 to 1 per cent. to 5 per cent . nchonidine and

ipal kinds

grown in Bengal, and C. officinalis, while practically a failure in Sikkim, is the chief species grown on the Nilgiri hills, and after that C. succirubra, and third in importance C. Ledgeriana

> MEDICINE. Red Bark. 1133

Medicine -This species thrives at a lower elevation than the others, but is comparatively poor in quinine, though rich in cinchonine and cinchonidine. It yields its best bark when eight years old From it is chiefly derived the "Cinchona Febrifuge," which is now largely manufactured at the Government Plantation of Rangbi, Mr. W. Elborne remarks (Pharm Soc Jour.). "The experiments of Mr. J E. Howard and others have proved that the bark of the root contains a larger proportion of alkaloids than that of the stem, and that the proportion of alkaloid diminishes upwards to the branches" Mr. David Howard has also shown that the nature of the alkaloid varies according to the part of the tree from which the bark has been taken

In the opinion of pharmacists the bark most suitable for medicinal use is the Cinchona succirabra The cause of this preference, as pointed out by Mr Holmes, are the following (1) the red bark supply will pro bably be always equal to the demand on account of its growing on a much lower elevation and consequent distribution over a much wider area, (2)

sellow barks for pharmaceutical preparations.

Red Cinchona bark is generally coated, and consists of liber, the cellular and tuberous coats, and usually more or less of the epidermis, its outer surface is rough, furrowed, and frequently warty, the colour of the epidermis varies from reddish brown to chestnut brown, cryptogamic plants are not so frequent as on some other kinds of bark. The cellular coat of the flat pieces is very thick and spongy. The inner surface of the quills is

C. 1133

1132

CINCHONA succirubra.

# Hybrids of Circhona

MEDICINE.

ing matter. He brockered of viring matter is not found in the growing plant is that he died lurk, and Mr. U. E. Howard consulers that it is really an exerctory product of veretainon, a part used up and brought by contact with the air into a value in which it can no longer be serviceable to the living plants, and from which it still degenerates by a still further degeneration into humar. It is by a process of exemicians that the red bank acquires its colour, the circhorance and in which it abounds having become crudised and changed into circhora red, and under these conditions the alkalo ds alto appear to undergo some corresponding alternations. The plant on a part of an acid, and is with difficulty separated. But the most remarkable feature is the altered condition of the whole, is now diminished, while cinchonine and cinchondine termin much the same. The qualit red back of Indian plantations is a much better drug, some of it yielding 5 to 10 per cent, of alkaloids, less much better drug, some of it yielding 5 to 10 per cent, of alkaloids, less

TIMBER. 1134 Hyprids. 1135

radial lines; meduling rays, closely packed, fine and very fine.

### HYBRIDS OF CINCHONA.

Kuntze, after examining the living Cinchons in the Indian plantations and working through the collections of dried specimens in the Herbarra and the literature of the species Cinchona, proposed to reduce all to four forms. It has been admitted by most writers that considertion for the species of the species indication than do the

submitted to Government in July 157, turnishes interesting information as to the tendency to hybridism among the species of Cinchona On this

Angustifolia 1136

Bonplandlana 1137 loids. It has been established the allied to the form Bonplandiana. From the fact that it is reproduced by seed, Mr. Howard suspects that it may be a species not a hybrid. Be

is now extensively propagated on the Nilgiri hills.

About the same period a valuable hybrid appeared in Sikkim among plants reared from Ceylon seed This is known as "the hybrid" to distin-

# Chemical peculiarities of the Cinchonas

CINCHONA.

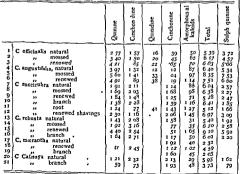
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curliaina converteris of the
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ate this
higher le
ment of I
promise I
vigorous grouth"

by hybridization or otherwise, so as to produce a plant that will give the maximum of quinine or other alkaloid desired to be obtained

# CHPMICAL PECULIARITIES OF THE CINCHONA PLANTS.

We may conclude this account of the forms of Cinchona grown in India by displaying their chemical peculiarities in the following table of comparative analysis taken from Mr. Lawson's report.—

The Analysts of the different kinds of barks grown on the Government estates given below, have been made during the past year by Mr. Hooper, the Government Quinologist



CHEMICAL PECULIARI-TIES 1138

# Chemical Peculiarities of the Cinchonae.

#### CHEMISTRY

Analyses of different kind of barks grown on Government estates, &c -conid.

	Quinine	Cinchonidine	Quinidine	Cinchonine	Amorphous al- kaloids	Total	Solph quaine
C Calisaya var Anglica C Ledgerians, natural C Ledgerians, natural C Javanica natural D branch C Humboldtians, matural D mossed C pitayensis natural D mossed C natida Pahudiana natural T renewed	branch tr 5 49 2 21	1 33 49 1 55 64 56 93 52 2 45 1 19	29 25 1 32 1 43 tr 1 10 63 78	1 49 2 04 87 1 07 2 54 1 49 49 43 1 93 1 91 2 33 1 45 2 8	44 36 88 59 48 45 90 1 07 39 37 55 67 43	3 91 2 65 8 52 4 7 4 44 3 37 5 18 3 43 7 67 6 68 5 99 96 2 85	1 09 7 38 2 97 3 01 1 72 3 14 5 12 3 36 1 91 05 68

Dr King furnishes the following analysis of the yellow and hybrid barks of Bengal --

'The Sikkim plantations produce red and yellow barks Of the yellow barks the following four analyses may be taken as characteristic.—

# Vellow Bark-(Sikkim).

Crystallued Sulphat Ditto	te of Quinine .	3 93	483	604	3 43
Ditto	of Cinchonidine	D 36	0.51	0 97	0.32
Dato	of Quin dine .	traces	ი ინ	0.01	0 85
Cinchanina		0.12	0.21		

"But besides red and yellow bark the Sikkim plantations now produce a large quantity of hybrid bark, the composition of which may be seen from the following analysis of four samples."

#### Hybrid Barks-(Sikkim)

Crystallized Sulpha	te of Quinine	6 12		3 12	
Ditto	of Cinchonidane	2 46			2.46
Ditto	of Quinidine .	traces	traces	0.30	
Cinchonine falkalo	irfa) ~ .	0.55	0.57	0.71	0 52 "

CLIMATE, SITUATION, AND SOIL SUITABLE FOR CINCHONA

Cultivation

----

In Bengal

Dr King's account of these is as follows —
"With regard to the chimate suitable for Cinchonas, it may be laid
down as a universal rule that none of the medicinal species with stand frost.
They prefer rather a cool climate, in which the contrast between summer and
winter rind between day and night temperatures is not very great. These
conditions are in some measure obtained in the Nilgiris and in Sikkim.
At Outcamund about 7,500 feet above the sea, the minimum lowest
temperature in the shade, calculated on an average of the three years is
about 49° and the miximum 69° Tahrenheit, and at Neddiwattum,
situated about 7,000 feet lower, the minimum, calculated also over three
years, is found to be about 54° Fahrenheit, and the maximum 66° Fahrenheit. Observations taked in 1856 and 1867 at an elevation of 3332 feet

Climate, &c., snitable for Cinchona Cultivation.

CINCHONA

CHITIVA. in the Rangbi valley, in Sikkim, show a minimum temperature of 40° and TIOV. 41 Tahrenl eit, and a maximum of 85 Tahrenbeit; the mean minima for

the two scars being 50'200 and 57'53"; the mean maxima 71'7" and 72 25" Exhrenheit; and the mean temperatures 65'6" and 64'80", respectively. The latter figures give an idea of a climate fairly suitable for succirubra, but rather co'd for Calisaya A more congenial climate for both species is indicated by the figures obtained at a lower station (elevation above the sea 2.556 feet) which, for the years 1566 and 1867, are as follow :-

Minimum temperatu	re .				4n" and	410	Fahr
Maximum					92 3* ,.	51,	
Mean minimum tem	perature.					(a bt,	
, maximum	**	•	•		106	81.21	**
, temperature		•	•	•	70 I .,	71 260	**

"In various parts of Ceylon a favourable climate for Cinchons is obtained, as will be seen from the following extract from a most reliable local nublication .-

"In the Dimbula district, for example, there is a mean temperature of

Dismissing and Cinchona without being injurious to human health,

first rather mis inderstood, their preference for incessant rain and mist having been exaggerated. It is found, especially on the Nilgiris, that all the species (and particularly the red barks) withstand long droughts. All the species assi sive supply of

growth during . - . After a continuance of dull steams days all the species seem to become tender, and a sudden change to bright sunny weather affects the plants in a most marked way, causing their leaves to flag. In Sikkim, succleabra makes its most vigorous growth during the latter half of the rains, but both on the Nilgiris and Himblayas the trees continue to grow for two months after the rains cease

"Observations which have been made show that (calculated on the returns of five years) there are at Ootscamund no fewer than 218 dry days in the year and at Neddiwattum about 240 dry days. The rainfall of the former locality (on an average of three years) is about 44 inches per

tos inches The rainfall in Sikkim is but is much affected by locality At

ing 1872, 165 55 inches of rain were registered, white at reishap (3,000 feet lower and 4 miles distant) only 120 6 inches fell.

"As regards elevation above the sea, it is found that in the Nilgiris succirubra succeeds best at alutudes of from 4,500 to 6,000 feet. An elevation of 7,000 feet is found to be too high, the growth being too slow to be profitable. Pale or crown barks thrive in a zone above this, and seem to succeed well even up to 8,000 feet. Calisaya on the Nilgiris has not

# Methods of Propagation in India.

CULTIVA-

braks thrive well from 1,500 to 3,500 feet, and can be get to grow both as low as 800 feet and as high as 5,000 feet; Calisaya thrives between 1,500 and 3,000 feet; Officialis does not thrive at any elevation.

better in newly-eleared forest than in grass lands of the sort so extensive in the N toires. The brown or pale barks, however, are more tolerant than t

than t
grass
open
open
cessful growth. As soon as the roots on a conclusion
subsoil in which there is any tendency for moisture to collect, the plant
most certainly begins to sicken and die. The basis of the soil of the
Nilguris is decomposed greiss; in Sikkim it is composed both of greiss

and of decaying mica schist,"

Methods of Propagation in India.—Dr. King writes:—

PROPAGA-TION, Bengal, II40

they will germinate as a compt.

most efficient mode of sowing them is in open beds which are sheutered by thatched roofs. The seeds must be sown in fine, rich, thoroughly-decayed vegetable mould, either pure or nixed with an equal volume of clean sharp sand which does not feel dayey or sticky when a little of it is taken up and compressed between the fingers. Mould of this sort can usually be easily collected in the forest, and is specially abundant at the base of old clumps of bamboo. After being sifted, the soil so collected should then be spread in layers about two or three inches in depth and five feet wide on beds of ground which have been previously well cleared

should be protected from rain and e sloping thatch. The surface of the

and afterwards a very

It is not desired to cover the seeds, but merely to steady them by a little earth above them here and there, so as to get them into proper contact with soil. Water should be given by means of a very finely drilled syringe. The seeds will germinate in from two to six weeks. When the

with es at es of

t an anicked out, the plants should temain

but for the past thelve years a distance or con-

#### Mede of Co'lecting the Bark.

CINCHONA.

adopted. The red bark, even in South America, is never a large trees Cinchona efficinalis is but a big shrub, and it is doubtful whether in India Calisaya will ever attain any very great use. Wide planting is therefore obsecuely an error. All the Circhoras, moreover, have the habit of through out a curet to of superficial to tiets, and young Cinchona plants ations do not thrive until the soil between the trees is sufficiently protects ed from the sun to allow these superficial rootlets to perform their functions freely. The growth of weeds is also checked by shade. By close planting, therefore, two desirable objects are speedly obtained, and more over, the trees are encouraged to produce straight elean stems, At the quantity PROPAGA-TIOY.

methral

positive

In Madras. 1141

ted very readily by seed or cuttings. The former mode is usually adopted for the sake of cheapness, while the latter is only resorted to when it is desired to obtain a stock of some well-known variety very rich in particular alkaloids. The seed is sown broadcast in beds specially prepared and made of rich leaf-mould. They are protected from the sun by light pindals, that is, by a thatch of ferns or mass raised 3 feet above the beds, or by branches ------. thick to completely shade

seedlings are pricked out

When they have grown

the pits are obcomy in ingred showers have set in, the plants, destruction from the ordinary

climatic changes, and, at the expiration of four or seven years, according to the species, they will yield their first harvest of bark."

COLI PCTION.

Bengal 1112

#### Modes of Collecting THE BARK.

In Bengal - Various methods of harvesting the bark crop have On the Sikkim plantations, the most profitable has been been adopted found to be the complete uprootal of the trees, and the collection of the whole of the bark from root, frunk, and branches. A modification of this, which has also been practised there as well as on some of the plantations in South India and Ceylon, is coppicing. It does not, however, by any means invariably happen that the stools yield coppies for they not un-frequently die, in which case the whole of the root-bark is lost; for the bark of any dead part of a Cinchona tree is always destitute of alkaloids,

"So long ago as 1863, the late Mr. Melver discovered that, if a portion

a fined to a many from living trees, and in covering the p

X 2

C. 1142

# Methods of Propagation in India,

# CULTIVA-

1140

braks thrue well from 1,500 to 3,500 feet, and can be got to grow both as low as 800 feet and as high as 5,000 feet; Callsaya thrives between 1,500 and 3,000 feet; officinalis does not thrive at any elevation

"All the species are most impatient of stagnant moisture at their roots, and therefore require an open subsoil, a sloping exposure, and the other conditions of perfect drainage. They cannot be got to grow on flat land Like most other plants, they prefer a rich soil, and for this reason they do better in newly-cleared forest than my grass lands of the sort so extensive in the Nilgiris. The brown or pale barks, however, are more tolerant than the other—for plants and so the sort so extensive grass land."

open well-dra cessful growth

subsoil in which there is any tendency for moisture to collect, the plant most certainly begins to sicken and die. The basis of the soil of the Milgris is decomposed geness; in Sikkim it is composed both of greiss

PROPAGATION.
BERGAL.
MPTHODS OF PROPAGATION IN INDIA -- Dr. King writes:

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decayed vegetable mould, either pure or mixed with an equal volume of clean sharp sand which does not feel clayey or sticky when a little of it is taken up and compressed between the fingers. Mould of this sort can usually be easily collected in the forest, and is specially abundant at the base of old clumps of bamboo. After being sitted, the sol so collected should then be spread in layers about two or three inches in depth and

It is not desired to cover the seeds, but merely to steady them by a little earth above them here and there, so as to get them into proper contact with soil. Water should be given by means of a very finely drilled synge. The seeds will germinate in from two to six weeks. When the

out in the same manner as before, only at distances of about 4 to 4 inches each way. When from 9 to 12 inches in height, the seedlings are ready to occupy.

at distances of and latterly at is six by six feet.

ith

but for the past twelve years a di tarce of four by four feet has been

C. 1140

#### Mode of Collecting the Bark.

PROPAGA-

"merica, is never a large tree; it is doubtful whether in India re. Wide planting is therefore moreover, have the habit of

throwing out a quantity of superficial rootlets, and young Cinchona plantations do not thrive until the soil between the trees is sufficiently protected from the sun to allow these superficial rootlets to perform their functions freely. The growth of weeds is also checked by shade. By close planting, therefore, two desirable objects are speedily obtained, and moreover, the trees are encouraged to produce straight clean stems. As the trees begin to press on each other, they can be thinned out, and a quantity of bark may thus be got at a comparatively early period, with positive advantage to the plants that are allowed to remain on the ground:

In Madras —Mr. Lawson gives the following account of the method pursued in South India. "All the Cinchonas may be propagated very readily by seed or cuttings. The former mode is usually adopted for the sake of cheapness, while the latter is only resorted to when it is desired to obtain a stock of some well-known variety veryrich in particular alkaloids. The seed is sown broadcast in beds specially prepared and made of rich

In Madras, IIdI

9 inches or a foot in height they are ready to be planted out in the estate. This is always done in wet and cloudy weather, and each plant is immediately protected with a little dome of fern. If this is not done, and the sun scorches the plants before they are well-rooted, their destruction is certain. For each plant a pit 2 feet cube is dug some months beforehand, so that the soil, when it is returned to the pit, is well existed and pulverized As all Cinchonas are lovers of rich food, their well-being in the early

#### Modes of collecting the Bark

COLLECTION.

In Bengal—"Various methods of harvesting the bark crop have been adopted On the Sikkim plantations, the most profitable has been found to be the complete uprootal of the trees, and the collection of the, whole of the bark from root, trunk, and branches. A modification of this, which has also been practised there as well as on some of the plantations in South India and Cejlon, is coppizing. It does not, however, by any means invariably happen that the stools yield coppice, for they not unfrequently die, in which case the whole of the root-bark is lost; for the Bengal II42

### Treatment of the Removed Back.

#### COLLECTION.

stems that had been operated upon with a coating of moss or straw in order to exclude light. The results of this process were very satisfactory both in the Nilgiris and Ceylon. It was also discovered that, provided natural shade he affected the straight of the straight

acquires its former thickness, and that the renewed bark is richer in alkaloids than the original burk. This process has been successful in the control of the bark under all of the bark under ants." Response

In Madras. 1143 'ctail (than in

The barker, with the snarpened point of an ordinary pruning kinfe, makes several cuts running down the stem parallel to each other, about an inch apart, and then with the blunt back of his kinfe, he raises every alternate narrow step and removes it from the layer.

injured, a new

away. If, on the other hand, the layer of cambium cells is crushed or scratched off by clumsy workmanship, no new bark will be formed in order to facilitate this new formation of bark the stem is covered with moss, grass, leaves of the New Zealand flax (Phormaum tenax) or some

so as to form a new bark. The tree should then be manufed, it possible, and allowed to remain for three years, after which those intervening strips of bark which were left on the tree are removed. And this process

is cut down and one or more shoots are allowed to spring up from its stool.

TREATMENT OF THE REMOVED BARK.

In Beng il —"After removal from the trees, Cinchona bark has to be carefully dried, and on the best modes of doing this careful experiments buy e been made. From these it has been found that exposure to a high

TREATMENT Bengal, 1144

C. 1144

#### Diseases of Cinchona Trees.

CINCHONA TREATMENT OF BARK.

In Madras.

1145

temperature, especially in a moist atmosphere, causes bark to become almost worthless. Even the sun's rays are hurtful, if bark is long exposed to them. To secure it in the best possible condition, bark should be taken off the trees in large pieces, and these should be arranged on drying stages, under shelter from the light and heat of the sun's rays, but freely open to the access of air. The pieces should be frequently turned. Bark should be taken off in dry weather only. If allowed to become mouldy off during wet Dry bark, on

weather. the othe calculate

drying, and branch bark from 75 to 76 per cent The Sikkim experience goes to show that trunk red bark loses 73 per cent, and twig bark 75

per cent" (King)

In Madras -" After the bark is removed from the trees it is dried by the sun or by artificial heat. It is then packed in gunny bags, forming bales containing 100th of the bark It is then despatched for sale, and sold either locally in Madras or in London" (Lawson) Mr. Broughton

exposing the idence of this. of the fact, so cars, however,

'Ar. Broughton

nt of weight in

iware, that the bark of opposite sides of the same tree differs in yield of alkaloids This is, of course only fill and ment in trees that are not all a posed to sunlight on each . s not generally occur " this, side

and shows that the b which for four months was more exposed to the sun than the south-

afforded 68 per cent, less alkaloid

DISFASES OF THE CINCHONA TREES.

DISEASES. 1146

"Cinchona trees are liable to a kind of canker, which often destroys the terminal and lateral branches, and not unfrequently kills the plants outright This canker is most abundant in situations where the subsoil is

on a subjects of special engany by the Unichonal Commission which sat in 1'71 The late Mr Mctver reported to the

unfounded, and that the Cinchona industry of Bengal had if anything less to fear from disease than almost any other branch of agricultural enterprise Dr. King, in the correspondence alluded to, established two diseases "one, a constitutional malady affecting the whole plant and usual-

C. 1146

### Diseases of Cinchona Trees

DISCASES

h fatal, the other local and by no means fatal. The former disease is confined entirely to trees which have teen originally planted in damp situations, or in a turtions which have become damp suffequently by the coring of drainage water in the way already explained. Disease first attacks the rox is of such trees. Its existence becomes apparent by the discoloruration of their leaves, which ultimately fall of landard shrivelling of the cortical and woody tissies then takes place from the reot upwards, and before this process has gone for the death of the plant has begun. This d servers in fact apparently nearly identical with that known to gardeners in Ingland as 'Canker'. It is not in any way infectious or contagious, as some appear to think. It depends entirely on a Lail cause, namely, second interesting the second moisture in the soft; and where that does not exist, it cannot occur." "The second form of disease dies not affect the entire constitut on of the plant, but manifests itself in patches on the seem and branches appearance of one of these patches is as if some escharit chad been dropped on the back, which is of a dark unnatural colour, showelled, day, and britile, occasionally these appearances extend to the wood, but as a rule they do not In size the patches sary, many are about the size of a shilling, others are much larger. They are not numerous on one tree and are often confined to a single branch. When small no apparent affection of the general health of the plant occurs, and growth goes on unchecked When, however, a large patch occurs on a small tree involving the back pretty nearly all round the stem, death results. Death from this disease is, however, as far as my observations go not common and it is a well-established fact that a tree which has been extensively affected will, when cut down, throw up from its stump perfectly healthy shoots, while in hundreds of trees at Ranghl, I have seen illustrations of recovery, the little patches of diseased bark being thrown off and replaced by perfectly healthy tissue, and the plant apparently as robust as if it never had been attacked." Dr. King adds that the disease is most prevalent during the rains, and that he is not prepared with any theory as to its cause. "This disease is not confined like the last to certain spots, but is found on plants in all parts of the plantation "

A careful examination of all that has been written and of the evidence recorded before the Cinchona Commission, leads to the conclusion that the iso diseases distinguished by Dr. King were by the earlier observers wewed as one and the same. If anything, Mr. Mcker and most other writers allude to the second disease,—the professional gurdeners and Cinchona planters assigning as a cause the damp sol to which Dr. King attributes the first disease. The late Mr. Scott in his evidence before the Commission, attributed, as a probable cause of the disease of the bark, the excessive hundity of the amosphere checking the transpiration and retarding thereby the circulation of the sap—an effect which he thought might cause evitration to sap into the tissue, effect which he thought might cause evitration to sap into the tissue, effect which he thought might cause evitration to sap into the tissue, effect which he thought might cause evitration that it is more prevalent during the rains and would at the same time point to the conclusion that in point of humidity S king possesses about the maximum that the Cinchona plant can be successfully propagated in Sikhim, C officialis cannot, but that species has been most successfully grown on the less humid slopes of the Nature bild.

It may be concluded that, with care in the selection of sites and the more perfect system of cultivation now pursued, all danger from disease has been practically removed

mas been practically t

Government Cinchona Febrifnge and Quimne

CINCHONA

## ANNUAL VIRID OF BARK.

In Beneal -The outturn of bark from the Government plantation was, in 1885 86, 339,201lb, bringing the total yield of bark up to 3256,027lb. Almost the whole of this large amount has been used up in the manufacture of the Government Cinchona Febrifuge-a medicine of which, during the past eleven years, 68,473b has been used up in India (for the effect of these on the imports of Quinne see the two concluding paragraphs of this article). The yield of bark shown above for Bengal, YIELD.

Bengal. 1147

Madras 1148

price realized per bale about R100, but in the course of a few years, when the estates have been restored to their former prosperous condition, the amount of bark annually taken will be greatly increased" (Lawson)

## RESPECTIVE VALUE OF THE ALKALOIDS

"As has been already explained, the medicinal cystallizable alkaloids contained in the bark are quinine, cinchonidine, quinidine, and cincho-nine, together with an amorphous alkaloid. A fifth called aricine is nine, together with an amorphous alkaloid occasionally found, but has never been used in medicine M Hesse has also recently announced the existence of another alkaloid occurring only in the succirubra bark grown in Sikkim. This base has received the name of quinamine. As everybody knows, it is the first named of these which has hitherto formed the specific for malarious fever. Bark for the manufacture of this alkaloid consequently brings a price in direct proportion to the amount of quinine contained in it. The barks of Calisaya officinalis and 41 1 .

VALUE OF

always been much esteemed, and of late years (since it began to get scarce) has brought a price as high or even higher than that got for the barks richer in quinine" (King).

# GOVERNMENT CINCHONA FEBRIFUGE AND QUINING

FEBRIFUGE. 1140

"It had for many years been suspected that the other alkaloids in which red bark is so rich are nearly, if not quite, as efficacious febrifuges

as quinine. The settlement of this point naturally demanded attention

given in the following extracts from their reports -

" In regard to the relative effects of the three new alkaloids, and with them chemically pure sulphate of quinine, the evidence derived from their use shows that with the exception of sulphate of cinchonine, as 312

#### CINCHONA.

# Government Cinchona Febrifage and Quinine. power, and in equal circumstances their use produced almost the same

FEBRIFUGE.

Physiological results. "The result conferment a margarit and · · 11 · the Commission last year, an nd doubt, that ordinary sulphate f quipine, and sulphate of quindine possess equal febrifuge power, that sulphate of cinchonidine is only slightly less efficacious, and that sulphate of cinchonine, though considerably inferior to the other alkaloids, is, not ithstanding, a valuable remedial agent in fever. "There is no longer room to doubt that the alkaloids are capable of being generally used with the best effects in India. They have been compared with quinine, a drug which possesses, more than any other that can be named, the confidence of medical practitioners here; and have been found by more than one observer, to supplement this sovereign remedy in some of its points of deficiency. The risk attending their use is clearly not greater than in the case of quinine, nor such as to be in any way deterrent; while the diversities of opinion on their relative usefulness and ; and nama, non in crystamizating quimine, and is nearly as nightly valued by the quimine-maker as good American fellow. The establishment of the therapeutic excellence of these alkaloids largely increased the value of the

red bark plantations in India, and made much easier of solution the problem of supplying its fever-stricken population with a cheap and effectual febrifuge. And for the solution of this problem the Government very speedily took active steps, by appointing Mr. J. Broughton, a the Nilgiri plantobservations on

ss for extracting

the whole of the alkaloids from succirubra bark, retired from the service of Government about 1877. The manufacture of Mr. Broughton's amorphous quinine was, however, discontinued on the departure of Mr. Broughton, and since then the whole of the bark produced on the Nilgri plantations has been disposed of by sale. In 1873, Mr. O. H. Wood was app Sikkim, and by

mixed alkaloids

febrifuge. The methods in use for the extraction of the arkaions from Cinchona bark depend, first, on the displacement of them from their -- -- ration with dissolving the spirit

ing the febrilinge as follows :-" The dry bark is crushed into small pieces

#### Government Cinchona Februfuge and Oumine

CINCHONA

FEBRIFUGE casks, where it is macerated

The liquor is then run off into of a strong solution of caustic

sodn a precipitate forms which is collected on calico filters, and well wash ed with water. The prec pitate is then dried at a gentle heat and powdered

d to a process of crude product is

y of a solution of sulphur in caustic soda is added to the liquor After the lapse of 24

hours the liquor is carefully filtered. The filtrate is mixed with caustic collected on calico and washed with a I powdered it is then ready for issue

CINCHONA PEBRIFUGE '

QUININE -By a Res city has been given to an

QUININE. 1150

reans of oil And Mr Gammehas

the whole of the quinine in yellow bark can be extracted in a form undistinguishable, either chemically or physically, from the best brands of European manu This can be done so cherply that, as long as the supply of bark is kept up, quinine need never cost Government much above twenty five rupees per pound. It is true that, at the present moment quinine is obtainable in the open market at rates not very different from this, but that is due to entirely exceptional causes. For some time back the Cerlon planters have been up rooting their Cinchona trees both to save them from disease and to make way for tea planting which appears no v to be becoming the principal industry of that Colony, and Cinchona bark has actually been sold in London below the cost of its product on

in Ceylon Indeed so far has " bark has been practically drive

matters which cannot continue

In the ordinary course, therefore, quinine might be expected soon to The object of making rise in the price of a

Method of extraction of the alkalonis from Cinchon bark by cold oil as used at the Go ernment Cinchona Fictory in Sikkim

"In order that the ol may speedly and effectually act on the Cin chonn bark, the latter is reduced to a very fine powder by means of Carter's eness, it is passed

ed for sifting flour six sided revolve-

140 It us to the lineal inch is driven at the speed of about thirty revolutions to the minute particles of the powder which may be too coarse to pass through the sik meshes drop out at the lower end of the revolving chamber and are again passed through the d sintegrator

2 A hundred parts of the finely powdered bark are then set aside to be mixed with 8 parts of commercial caustic soda, 500 parts of water, and 600 parts of mature composed of 1 part of fusel of to 4 parts kero-sine oil. If the caust c soda be of inferior quality, a little slaked 1 me

# Government Cinchona Februlege and Online

# QUININE.

(about 5 parts) may be used in addition to the 8 parts of caustic soda, or caustic soda may be altogether omitted and 15 parts of slaked lime may be used instead of it. The caustic soda is dissolved in the water and mixed with the back. Then the oil is added and the whole is kept thoroughly intermixed in an agitating vessel. Should lime be used it is mixed in fine powder with the dry bark before adding the water and oil

"3 The agitating vessels in use at Mungpoo are barrels with winged stirrers revolving in them vertically, and with taps on the sides for drawing The first stirring is carried on for four hours, and then the off the fluids whole is allowed to rest quietly in order that the oil may separate out to the When the oil which has now taken up the greater top of the watery fluid part of the alkaloids, has cleared out it is drawn off by a tap placed just above the junction of the two fluids. The oil is then transferred to another agitator, and is there thoroughly intermixed with acidulated water for five or ten minutes the mixture being again allowed to rest for the separa tion of the ol It will now be found (if sufficient acid has been used and the surring has been thorough) that the alkaloids have been removed from the oil to the acidulated liquor. The oil is again transferred to the bark mixture, and is kept intermixed with it for two or three hours, the oil is again drawn off in the same way washed as before in the same acidulated liquor, and this process is repeated a third or a fourth time or until it is found, by testing a small quantity of the oil, that the bark has been thoroughly exhausted of its alkalo ds Each stirring subsequent to the second need not be continued for more than an hour The quantity of acid required to take up the alkaloids from the o I will entirely depend on the quality of the bark operated on If the bark contains 4 per cent of alkalo ds, about 2lb of either sulphuric or muniatic acid mixed in thenty gallons of water should be sufficient and so on in proportion

"4 The after-treatment of the acidulated water containing the alkaloids depends on the product desired and on the kind of acid that has been used Should sulphate of quinme be desired and sulphuric acid have been used the liquor is filtered (if necessary), heated, and made neutral by adding a very weak solution of either caustic soda or liquor ammonia allowed to cool and as it cools the crystals form out These crystals are afterwards separated from the mother I quor by dra ning through a cloth After they have been thus obtained the crystals are dried are next dissolved in about fifty times the r weight of boiling water. The resulting liquor is filtered hot through a little animal charcoal. On cooling after filtration the crystals again form out, and they are separated as before from the mother I quor by filtration through a cloth. The crystalline mass obtained by filtration is then placed in small lumps on sheets of white blotting paper stretched on slabs of plaster of Paris By this means they are practically dried. They are afterwards thoroughly dried by being laid on blotting paper in a room heated to about 10 degrees above the temperature of the open ur

5 H Cinchona febrifuge is wanted the alkaloids are exhausted from the oil by muriat c acid the solution being neutralized and filtered in the same On an excess of caust c soda solution being added the alkalo ds After standing some hours the whole bulk of I quor and are precip tated precipitate is passed through cloth filters, and when the alkaline liquor has drained off the precip tate is washed with a little plain water dried, and powdered The powder is Circhona Febrifuge ready for use "

# TRADE IN CINCHONA

PRESENT CONDITION OF THE BARK TRADE -Dr King has kindly furnished the following paragraph on this subject -"The present condition

TRADE. 1151

Foreign Trade in Cinchona.

CINCHONA.

of the Cinchons bark trade is one of depression. This is by no means due to any diministion of the demand for the Circhons alkaleads, but in a great measure to the fact that an entirely ness source of quantum has of late been discovered in the northern parts of South America. This

( ...on

years been poured into the London market in enormous quantities under the designation of Cufree bark. The depression is also preatily due to the enormous exports from Ceslon, where enchons is everywhere leng up-rooted to make was for Tes. The effect of these flustings has been temporately to swamp the market, the Cufree reusings out the more costly Cinchons barks. The Cinchons planter, however, his only (if he can afford it) to pla

bark goes on much become carce in all

must soon diminish

increase of wealth in tropical countries, the consumption of quintine must steadily increase; at any rate, as long as multious fevers continue to exist in these countries."

Remya plants have only recently been introduced into India. Plants are being grown in the Sikkim plantations, and Mr. Lawson alludes to those in the Nilgin plantations as 100 young to advance any opinions regarding the success of this new undertwing. It seems probable, however, that it may be found possible to cultivate the Cupreaburk, plant in regions where labour may be less expensive than is the case with the Cinchona plantations. Remija purdicana and R pedanculata yield the Cupreabark of commerce.

In the official correspondence regarding Cinchona, various opinions have been given as to future prospects. Mr. J. E. Howard, in a letter addressed to the Secretary of State in 1872, remarked: "It remains that the planters should not over supply the demand of the world; this, indeed, is a possibility, but one so remote that it may be dismissed from all thought for at least the present generation, and the range of altitude above the sea fivel and the climate under which the Cinchon can be profitably grown are at best extremely limited, as Mr. Broughton's reports abundantly shew, and ""

plantations a mitted that the abandoning (

can source of more than fitteen years. An expenenced Ceylon planter stated at a meeting of the Royal Pharmaceutical Society that the price now paid for bark had fallen so low that profit had become problematic.

# INDIAN FOREIGN TRADE IN CINCHONA AND QUININE

The earliest notice of Indian-grown Cinchona bark in the London market occurs in 1867, but it was some years later before the brik assumed a commercial position. Ten years later, in the Review of Trade for 1875-76 Mr. J. E. O'Conor remarks. "The total value of the imports of guinne in 1875-76 me R. r. v. 60.

The total value of the import duty.

which, in the nine months of It is manifest that as yet, eve

#### CINNABAR.

# Foreign Trade in Cinchona : Cinnabar.

TRADE II

shape of imported quinine and the alkaloids of Cinchona produced in India at the cost of the State, this valuable februage can reach only a fraction of the population."

From

t83.3.4 which date they tr 12,058th valued in the value of orts to a many the value of the value

of 1882-83.

hoped, and indeed it has been some, invested in the business with expectatior distant future. The fall in prices and the have restricted the trade; but though its

ine as a commercial article, reference ided among Government stores. It is satisfactory is satisfactory in the febriuge, the in 1876-77 at in the placed plantations, the immense benefit content of the Government effort to provide the only trustworthy specific against the malaria which carries off annually its thousands of the population. In a note written for the Colonial and Indian Exhibition Catalogue Dr. King

says; ""
of rupee
ducts fro
amounts

substituti quinne amounts to over twenty-five lakhs of rupees" (£250,000).
"The Government plantations on the "

1885, 1,618,744 cinchona trees of various of 1884-85 these plantations yielded a

results of the Nilgin plantations since their commencement shows a net surplus of profit of R5.51,743 (£55,174)"

# CINNABAR.

1153

Cunnabar is a sulphide of mercury, known in the vernacular as Skirrgarf. It is used in dyeing, but more for domestic use than by the professional dyer. It is said to be found in Central India and to be also produced artificially: it sells for R140 a cwt. See Mercury.

	iners.
CINNAMOMUM, Blume; Gen. Pl., III., 155. Cinnamomum Camphora, Nees; Fl. Br. Ind., V., 134; Wight, Ic., 1. 1818; LAURILE.	1154
JAPAN CAMPHOR OF Commerce is obtained from this tree.  Sym.—Camphors officinaria, Ness, Laurus Camphorifera, Kamp. 1.  Roth, Fl. Ind., Ed. C.B.C., 340.  Habitat  Japan, and  Galcutta  formation  1802	
see Campbor.  C. glanduliferum, Messin., Fl. Br. Ind., V., 135.  The Nepal Campion Wood; the Nepal Sassafras.  Syn.—Laters Glandulifera, Wall, in Act. See, Med. and Phys., Cal., J.  Veth.—Mollicia, marician, Nepal, Roba, Lepcha, Gunserai, Mechi. Acs.; Gandio, Cacasa.  References.—Brandia, For. Fl., 375; Gandle, Man. Timb., 375; Voict, Hottl. Sub. Cal., 375; Pharm. Ind., 1376.  Habitat.—A. large tree of South Humálay a from Kumáon castwards	1155
to Avann, the Khásia Hills, and Sylhet. Medicine.—In the Indiant Pharmaceperia this plant has been recommended as worthy of more attenuon than has been hitherto paid to it. The wood may be used as a substitute for assafras. Ultim Dipt. Cor. Structure of the Wood.—Rough, pale brown, highly scented, with a streng smell of camphor when fresh cut; has a certain lustre. Weight a St. per cuba food. It detantly resembles that of an Ablizzia on a vertical section, but is rougher, it is soft to moderately hird, even-grained Durable, evolw worked, and is not touched by insects. Used in Assam for tomoes and beat building; in Sikkim for boxes, almirahs and other articles; also for planking. It is being tried for sleepers (Camile).	MEDICINE. 1156 TIMBER 1157
C. iners, Reine: F. Br. Ind., V., 130; Wight, Ic., 1, 130, 122, 133.  Spin—Laties Middle, Rob., R. Ind., Ed. C.B.C., 352 Vern.—Tonipolarkini, dar chini, Hind Tanch dalchini, Drc.; Remakadalakhini, randalchini Mar.; Tikki Bons., Kettudirisera, India, ambidalakhini, randalchini Mar.; Tikki Bons., Kettudirisera, India, ambidalakhini, randalchini Mar.; Tikki Bons., Kettudirisera, India, ambidalakhini, va agan, da kini, Mar., Adarbidarina pagabit Jis., Anthalitera Chi, Indiarea, Lit. carea, Mar. in darbidarina pagati, da kini, va agan, da kini wann, Iringen vali, Irangala va	1158
Nedimental Decision with process in the problem of a power!  or record of most for a read to cord of the article to a office of a read to cord of the article of the first of the article of the artic	1173 Trie

CINNAMOMUM Tamala

The Cassia Ligues

MEDICINE

closely in medicinal properties, for which they may be substituted Paden Powell says that the leaves are considered by the natures hot and cardiac, and that they are useful in colic, indigestion, and nausea. The bark is prescribed by the hakims in debility of the stomach, enlargement of the splicin, affections of the nerves or heart, pains in the womb, also in retention of urine and catamenia, and bites of serpents and poisoning by opium "An aromatic oil extracted from the fruit and leaves is used as a medicine" (Bonth Gas, AV, 66)

cine" (Bomb Gas, NV., 66)
Special Opinions — § "Dalchini, used in dispensary in place of true
cinnamon; equally efficacious" (Assistant Surgeon Nelial Sing, Saharunfore) "The leaves in Kashmir, Barg-1-Taj, are employed as a substitute for
Chavica Betle, Rets" (Surgeon-Bujar 9, E. T. Atchinon, Simia) "Used
with long-peper and honey in coughs and colds, also in bronchits and kay
asthmir (Brigade Surgeon 7, H. Thoriton, Blonglyr) "Given in
decoction or ponder in suppression of lochia aliae child brith, with much
benefit" (Surgeon-Bajor F, F, Ratton, Salem) "Is used in coughs,
flattleience, and levers" (Surgeon-Bajor D, R. Thomson, Madras)

CHEMISTRY.

Chemical Composition—"Cassia bark owes its aromatic properties to an essential oil, which, in a chemical point of view, agrees with that of Ceylon cinnamon. The flavour of cassia oil is somewhat less agreeable, and, as it exists in the less valuable sorts of cassia, decadedly different in aroma from that of cinnamon. We find the specific gravity of a Chinese cassia oil to be 1066, and its rotatory power in a column of 50 mm long, only of to the right, differing consequently in this respect from that of cinnamon oil.

"Oil of cassia sometimes deposits a stearoptene, which when purified is a colourless, inodorous substance, crystallizing in shining, britile

prisms We have never met with it.

"If this sections of cassia bark are moistened with a dilute solution of perchloride of iron, the contents of the parenchymatous part of the whole tissue assume a dingy brown colour, in the outer layers the starch granules even are coloured. Tannic matter is consequently one of the chief constituents of the bark, the very cell walls are also imbued with it. A decoction of the bark is turned blackish green by a persalt of iron.

"Il cassaa bark (or Ceylon cinnamon) is exhausted by cold water, the clear liquid becomes turbid on addition of todine, the same occurs if a concentrated solution of todide of potassism is added. An abundant precipitate is produced by addition of todine dissolved in the potassism sait. The colour of todine then disappears. There is consequently a substance present which unites with todine, and, in fact, if to a decoction of cassa or cinnamon the said solution of todine is added, it strikes a bright blue coloration, due to starch. But the colour quickly disappears, and becomes permanent only after much of the test has been added We have not ascertained the nature of the substance that thus modifies the action of todine, it can hardly be tanne matter, is no have found the reaction to be the same when we used bark that had been previously repeatedly treated with spirit of wine and then several times with boining ether.

"The mucilage contained in the gume-ells of the thinner quills of cassia is easily dissolved by cold water, and may be precipitated to gether with tamin by neutral dectate of lead, but not by alcohol. In the thicker barks it appears less soluble, merely swelling into a slimy jelly." [Pharmacographia, 521].

The leaves are known as Teppat, and the bark as Tay Food—The BARK and the dried Leaves are used to flavour dishes. It is much employed to adulterate true cinnamon

FOOD Bark IIOI Leaves IIO2

C 1192

# The Cassia Lignea

#### CINNAMOMUM Tamala.

Structure of the Wood -Reddish grey, splits and warps, moderately hard, close grained, slightly scented, not used Weight 39 lb per cubic foot

TIMBER 1103

Introduction of Chinese Plant .- Dr King, in his report of the Botanic Gardens of Calcutta 1883 84, alludes to plants received from Hong-Kong any profit 1104

TRADE. 1195

### FOREIGN TRADE OF CASSIA LIGNEA

Year	IMP	etac	Exports and Re exports		
	Quant ty	Value	Quantity	Value	
	cwt	R	cwt	R	
\$\$0-81 • \$\$1-\$2 \$\$2-\$3 \$\$3-\$4 \$\$4-\$5	19 660 9 705 13 240 19 917 14 769	4 68 576 1 90 891 2 61,543 3 84 491 2 48,344	4 487 3 865 2 211 5 365 4 692	1,18 248 94 408 45 921 1 05 310 81,394	

# Imports for 1884-85

Pres dency to which imported	Quant ty	Value	Country from which imported	Quant ty	Value
Bombay Bengal Madras	cwt 12 308 2 226 235	41.460	Aden Ch na-Hong-Kong Straits	c vt 13,557 1,212	R 2 24 805 23 536
TOTAL	14 769	2 43 344	TOTAL	14 769	2 49 344

# Re-exports for 1884 8c

Pres dency from wh ch exported	Quant ty	Value	Country to which exported	Quant ty	Value			
Bombay Bengal Sindh	cwt 4 675 13 4	R 81 114 225 55	Pers a Arah a Turkey in As a Other Countries	cwt 2 785 980 715 212	R 49 8 6 17 051 11 955 3 561			
TOTAL	4 692	81,394	TOTAL	4 692	81 394			

trade is done in Bombay in the C or Malabar Cass a 15 also larg

The former he says, is sold at 31 and an appear it is not at about R5 for 374h In a further page he alludes to C Tamala, so that, apparently, the Malabar Cassa is according to Dr Dymock, different from C. Tamala Definite information regarding the Indian trade in C Tamala cannot be obtained but it seems probable very I tile if any of the truly Indian bark is exported

# CINNAMOMUM zevlanicum

#### True Clenamon

1106

Cinnamomum zeylanicum, Bron ; Fl. Br. Int. V. 171; Wight. TRUT CINNAHOY. 16.1 127.

Sym-Laures Cinnanouen, Bull I hard, Fl. Int., FI CRC, ap.

Lowell, Ib Pe, 172, Bu Bomb Level, 71, Liba furnery, 106, 112, Buff-Botany; Took Acti, at 26, 28 Met Top Aime

Kes, Vol. VI, 175, Kew Garten and Arboretum, 3

CAMPHON. 1197 DYE 1103

Buck, Dyes and Tans of ge should be referred to

OIL. 1100

ntial oil of cinnamon an obtained from this plant, Distillation is carried on

The oil is of a goldenand aromatic. The leaves mes exported

e third oil is obtained from the root, of yellow tolou, and a strong camphoraceous taste an odoar of camphor and cinnamon, and a strong camphoraceous taste in water, with

A fatty oil expressed from the fruit is also noticed by early writers, but it es at present unknown ----- of et a finest description

e derable firmness and solidity the quals of bain a c abon of with insomen hat extremely

It has a , bearing

but with a buri

yield a brown, from Ceylon a

True Cinnamon.

CINNAMOMUM zeylanicum.

here and there scars or holes at the points of insertion of leaves or twigs. The inner surface of the bark is of a dirker hue. The bark is brittle and splintery, with a fragrant odour peculiar to itself and the alified barks of the same genus. Its taste is saccharine, pungent, and aromatic" (Pharmacegraphia, p. 525).

MEDICINE. Eark. 1200

on. 1201

oil of cloves. (Pharm. Ind.) "Cinnamon is largely used in compound prescriptions. A combination of cinnamon, cardamoms, and triphatra leaves, passes by the name of triphatra, these three aromatics being often used together" (U. C. Dutt). As a powerful stimulant it is given in cramps of the stomach, toothache, and paralysis of the tongue (Murray). Bode Powell rotices the use of cinnamon in low fever and comiting, and also as an addition to purgatives to prevent griping. Cordial and astringent properties are also ascribed to it.

Special Opinlons.—§ "Powdered cinnamon in 20-grain doses is a reputed medicine in dysentery" (Astituta Surgon T. N. Chots, Mercut), "Appears to be useful in certain forms of amenorthea when chewed or so Ul Cinnamon!" (Surgeon. Major G. P. Hunter, Karachi). "The bark ground up with water into a passe is applied to the temples in neuralgia and severe headache" (K. N. A. Dacco). "Warm stomach cordial, carminative and astringent, useful in flatulence and diarrhea. Cinnamon oil applied locally in very small quantity gives great relief in neuralgic headache" (Surgeon C. M. Russell, M. D. Sarun)

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England. It was prepared by Valerius Oordus, who stated, somewhat before 1544, that the oils of centration and clotter belong to the small number of essential oils which are heaver than water, 'finidum petunt' About 1531 the essential oils of entimatom, mace, clottes, pepper, numegs, and several others, were also distilled by Quintherus of Andernach, and again, about the year 1586, by Porta.

"In the latter part of the last century it used to be brought to Europe by the Dutch. During the five years from 1735 to 1770 inclusive, the average quantity annually disposed of at the sales of the Dutch East India Company was 176 ounces. The wholesale price in Landon between 1776 and 1782 was 215 per ounce, but from 1785 to 1789 the oil fetched

## CINNAMOMUM zevlanicum

### True Cionamon

#### CHEMISTRY.

FOOD Bark

1203

1204

r which we have not examined icreby contaminated with resin

"Cinnamon contains sugar mannite starch mucilage, and tannic and The commontain of Martin (1863) has been shown by Wittstein to be very probably mere mannite. The effect of soduce on a decoction of cinnamon will be noticed under the head of "Cassia Ligner." Cinnamon afforded to Schallar (1862) S per cent of ash consisting chiefly of the carbonates of calcium and potassium." (Pharmacog, 526)

Adulteration—The authors of Pharmacog, 3201

Adulteration—The authors of Pharmacog, 3201

Ignea being much cheaper than cunamon is very commonly substituted for it. So long as the bark is entire there is no difficulty in its recognition but if it should have been reduced to powder, the case is usely different. We have found the following tests of some service when the spice to be examined is in powder. Make a decoction of powdered canamon of known g.

of the suspected powder Wher

each with one or two drops of time mon is but little affected but in that of cassia a deep blue-blue blue to the mon make make the same make and the same and the

from

corrosive sublimate or Food -It is chiefly

tionery, also in curry, and enters into the preparation known as pan

# FORFIGN TRADE OF CINNAMON

Year	Inp	ORTS	Exports and Re exports		
	Quant ty	Value	Quant ty	Value	
1879-So 1880-St 1881-S2 1882-S3 1883-S4	B 1 785 7 707 2 244 18 731 13 687	R 484 3 512 512 3 641 2 640	15 202 19 432 67 466 27 768 35 181	R 24 4 833 14 436 11 068 9 330	

# Detail of Imports, 1883 84

Prov nce into vh ch mported	Quant ty	Value	Country whence	Quant ty	Value
Bengal Nadras Br t sh Burma	ib 9 6 12 547 224	R 437 2 143 60	Stra ts Settlements Other Countries	11 924 1 763	R 2 034 600
TOTAL	13 687	2 640	TOTAL	13 687	2 640

Faise Pareira Brava.

CISSAMPELOS Pareira

Detail of Exports, 1883-84

TRADE

1205

Province from which exported		Quantity	Value	Country to which exported	Quantity	Value	
Bengal Bombay Madras	:	:	1b 4,032 745 30,434	R 860 122 8,348	United Kingdom Mauritius Other Countries	30 334 3,472 1,375	R 8 328 690 312
то	TAL		35,181	9 330	TOTAL	35,181	9 330

CISSAMPELOS, Linn.; Gen Pl , I , 37, 962.

Cissampelos Pareira, Linn, Fl Br Ind, I, 103, Menispermace & FALSE PAREIRA BRAVA.

Syn -C HERNANDIFOLIA, Wall, Cat, 49, 79, partly, Rorb, Fl Ind,

Syd — HERNANDIFOLIA, waii, out, 49/19, persylvaria, the CB CA of Adah International Company of the CB CA of Adah International Case of the Adah Case of the Adah Case of the Adah Kara, Batalpott, Nepal, Katori, titer, parish, patash, or bet, sabin hanyat, sutum yeat, bottande phit (teaves), pilyari, pilgur, and katori (toot), PB, Katori (toot), beljetik (teaves), Sind, Mirbist (toot), Dur, Venueth, Boms P, Paryol, GoA, Pomushite, pun mishite, vata traphe, Tam, Pata, Tel, Ambashitan patha, Sans, Deparatica, seem sedia, Sin Gambie, Man Timb. 11

References -Brandis, For Fl, 10, 571 Gamble, Man Timb, 11 F. C. 1

Habitat -A lofty climber, common both to the Old and New Worlds In India it is met with in the tropical and subtropical provinces from ipore, ascending in the hotter Common below Simla at that

Talse Pareira Brava of druggists The true drug is, however, derived from Chondodendron tomentosum. Ruis et Pav, growing in Peru and Brazil Cissampelos Pareira was, for a long time, believed to have been the

Description of the Drug -"'i

drical, oval, or compressed piec inch to four

nches to four feet in length Bark grevis crossed transversely by annular ele grey, porous, with welmarked, often incomplete, concentric rings and medullary rays. Taste at first sweetish and aromatic, afterwards intensely bitter." (Pharm Ind.)

In distinguishing the true from the false drug, the following facts have to be borne in mind "In the root of Chondodendron there is a large well-marked central column composed of wedges diverging from a common axis, round which are arranged a few concentric rings intersected by

MEDICINE Root 1200

C 1206

CITRULLUS Colocynthis

Palse Pareira Brava; Colocynth.

# MEDICINE.

wedge-shaped ray, which are often irregular, scattered, and indistinct. The axis is not often eccentric. In Cissampelos Pareira the root and stem are nearly alike in structure, and in transverse section there are concentric rings." "(Year-Rook of Pharm., 1873, 30.)
Medicine.—The dried Root and Bark are used as mild tonics and

Root. 1207 Bark. 1208 Leaves 1209 Medicine.—The dried RODT and RARK are used as mild tonics and dittreties in advanced stages of acute and chronic cystijis and catarrhal affections of the bladder; also exercases appreently an astringent and sedative action on the mucous membranes of the gentio-urinary organs. They are generally administered in the form of decection and extract. The leaves are applied to abscess. Alinsile writes: "The leaves of this plant are considered by the systiant as of a peculiarly cooling quality, but the root is the part the most esteemed; it has an agreeable, biterish taste, and is considered as a valuable stomachic. It is frequently prescribed in the latter stages of bowel complaints, in conjunction with aromanes. Cissampelos Pareira has been very highly extolled by several writers for its medical virtues, particularly by Sloane, Maregranf, Barham, and Wright. The first speaks of the ellicacy of the leaves as a vulnerary for

Rayham, sentence con cony a syrup

k

a

a

d

d

d

CHEMISTRY. 1210

a yellow bitter principle, a brown colouring matter, statch, an acousted substance, and various salts of ammona and hime. (O'Shaughnessy). Wiggers discovered in this root the substance pelosina, which exists to the extent of about § per cent.

6 "Contains a butter principle, Buxine, which, according to Fluckiger, is probably identical with Berberine" (Surgeon C. J. H. Warden, Professor of Chemistry, Calcutta).

Cissus carnosa, Lam., see Vitis carnosa, Wall, AMPELIDEE.

C. discolor, Blume, see V. discolor, Dals.

C, edulis, Dalz., see V. quadrangularis, Wall.

C. pedata, Lamk, see V. pedata, Vahl.

CITRULLUS, Schrad.; Gen. Pl., I., 826.

ızıı

Citrullus Colocynthis, Schrod.; Fl. Br. Ind., II., 620; Wight, Ic., 1. 498; Cucurbitaer.
Colocyntu, Eng.

Cclocyath.

CITRULLUS Colocynthis

Syn—Courses Coloctvites, Lee., Rich F., Iel., Ed. C.B.C., 700.

Vern—Integree, mail., Hivo: Mellint, interfere, Ben.G.; International Color, Richard, principle, Histories, interference, interference

Habitat.—An annual fourd wild in waste tracts of North-West, Central, and South India. It is the wild gourd of the Book of Kings.

The plant cannot be said to be systematically cultivated anywhere in India, the fruits are collected from plants which grow wild on certain desert tracts of North-West India (Dat) is and Fuller).

Oil.—Yields, according to Ainslie, a clear, limpid oil, used in many of the southern provinces for burning in lamps. (See below.) It is said to be

used to due the hair.

Medicine.—The Pharmicepian of India describes Colocynth as a

OIL. 1212 MEDICINE

Fruit.

1213

OII.

1214

Root

1215

ascites, enlargements of the abdominals iscera, urinary diseases, theumatism, &c. An OIL prepared from the seeds of Indian Colors oth is used for blackening grey hairs. A poultice of the ROOT is said to be useful in inflammation of the breasts," (U. C. Dutt, Mat Med. Hird) According to the Muhammadan writers, Colocy nih is a drastic purgative, removing phlegm from all parts of the system. They recommend the fruit, leaves, and root to be used in costiveness, dropsy, jaund ce, colic, worms, elephantiasis, &c. It acts as an irritant on the uterus, and its fumigation brings on the menstrual flow. The author of the Mathean describes a curious mode of administration "A small hole is made at one end of the fruit and pepper-corns are introduced, the hole is then closed, the fruit enveloped in a coating of clay and buried in the hot ashes near the fireplace for some days; the pepper is then removed and used as a carminative aperient. A similar preparation is made with rhubarb root instead of pepper' (Drmock, Mat Med W Ind.) Murray, in his Affaratus Medicaminum, recommends the use of the tincture of Colocynth in cases of gout, rheumatism, solert headaches, and palsy, in doses of fifteen drops, morning and evening. Dr Kirkpatrick states that the rind with rhubarb is used by the native practitioners in suppression or repress on of urine.

CITRUS.

# The Genns Citrus,

Risso, as a synonym under C. nobilis, Lour. (the Mandarin)-a species which he regards as quite distinct from C. Medica, Linn

The specific distinctions in Citrus are based chiefly upon the degree to which the petiole is winged, on the colour of the flower (pinkish-whitein the lemons and pure white in the oranges), and on the shape of the fruit, pearshaped and more or less mamiliate in the lemons and globular and non-mamiliate in the oranges. Species characterised by the degree of development of a certain feature must naturally under cultivation become hopelessly intermixed, hybridisation rendering it almost impossible to distinguish the forms. This is true in its fullest extent with the members of the genus Citrus, and it is by no means an easy task to say in what respects an orange differs from a lemon. The extreme forms are readily enough recognised, but these break down when a large collection is examined side by side. The writer, honever, is disposed to agree with Kurz that there is no advantage gained by combining the Sweet Lime (C. Limetta, Risso) with the Sweet Lemon (C. Medica, var Lumia, Risso) It would seem destrable to necept Roxburgh's position, and to place the majority of the forms described by him under C. acida, Roxb, along with C. Lunettin, Risso, but apart altogether from C. Medica. The writer would even go further and view the lemons as having by no means so distinct a claim as the limes to be regarded of Indian origin. The limes appear intermediate in character between C. Medica and C. Aurantium, having the rounded fruit, white flowers and winged petioles of C Auranturn, with the flavour, chemical properties, and peculiar character of the rind of C. Medica Whether Kurz be correct in viewing the sweet lime of India as but a form of C nobilis, the Mandatin of China, may be doubted, but these are certually allied plants, and to this group should be added C. Hystrix, the three species being separated from C Medica and C. Aurantium by their very much smaller flowers. It is usual to regard the small round, dark orange-red fruits sold at full stations as Mandarins, and DeCandolle states that Mr O B. Clarke is of opinion that the cultivation of the Mandarin is extending on the Khasia hills. Or Bonavia appears to doubt the existence of the Mandarin in the Khásia hills but recommends its introduction. That author speaks of good Mandarins as occurring in Ceylon, but is unaware of any in India. The true Mandarin, in the opinion of most writers, does occur in India, but it would be interesting to have the question of its relation to the sweet time more clearly established According to Kurz, these two cultivated plants are one and the same species, C. nobilis, being much cultivated all over Burma conclusion may not, however, be regarded as satisfactory, from the fact that the Mandarin is chiefly characterised by the extreme thinness of the rind and deliciously flavoured pulp, whereas in the sweet lime the rind is coarse or even thick, and the pulp much inferior to that of the Mandarin Dr Rice regards the Mandann or Maltese orange as a variety of C. Aurantium, C Hystrix is the characteristic wild species of Burma,

Having now indicated very briefly the present position of this subject, and the probable changes which may be effected in the grouping of the known forms, it will not be necessary, for the purposes of the present publication, to depart materially from the attitude taken by the authors of the Flora of British India The following analysis drawn from that work, with one or two additions from Kurz's Forest Flora of Burma (published

subsequently), may be found useful -

* Young shoots and leaves perfectly glabrous, transverse vesicles of the pulp concrete

A shrub, young shoots purple, petiole more or less naked, petals generally tinged with red, flowers

#### The Sweet Orange

CITRUS Aurantium.

often unisexual, stamens 20-40, style long, thick, fruit globose, ovoid or oblong, often mamillate,

rind very thick and rough

C. Medica.

th A tree 15 to 25 feet in height, petiole short winged, flowers small, white, usually solitary, style long, thick, fruit globose or somewhat oblong, not mamil-Inte, rind very thin, nearly smooth, shining, yellow or orange coloured

C nobilis (and P C. Limetta)

Note .- If C. Limetta be added as a synonym of C nobilis the definit on of the rind would have to be modified

+++ A small shrub, leaflet smaller than the broadly winged petiole, flowers as in C nobilis, only pedicillate and clustered in the axils of the leaves, style very short, fruit globose or ovoid, a little larger than the size of a walnut, rind thick, yellow .

C. Hystrix

++++ A tree, young shoots whitish, petals more than twice the length of those in the two preceding species, flowers bisexual, stamens 20-30, style long thick, fruit globose or flattened, pulp sweet, acid or bitter

C. Aurantium.

** Young shoots and under-surface of the leaves pubescent . transverse vesicles of the pulp distinct .

C decumans

value

Citrus Aurantium, Linn (in part), Fl Br. Ind, I, 515, RUTACEE

The name Aurantium is not derived from the Latin Aurum "gold," but comes to us from the Arabic narand; This became narend; (narang) in the Persian and its equivalent in Sanskrit is nagaranga, and in Hin dustant narange. Names beginning with nar are generally associated with fragrance. The name for the orange first reached Europe through the Moors and became naranga in Spanish laranga in Portuguese, Arancio

wards a as also

bitter o

The English word orange is derived from the same root (Rice, orange DeCandolle, Yule Burnell, &c)

Var 1. Aurantium proper (var & dulcis, Linn) (For var 2, see \$ 345) Botanical Diagnosis - Petiole naked or winged, pulp sweet, vellow, very rarely red, rind loose or adhering

> THE SWEET ORANGE, CHINA ORANGE, PORTIGAL ORANGE, Eng., ORANGER, Fr., ARANGIO DOLCE, PORTOGALLO, MELARANCIO, II , NARANJO, SP , LARANJEIRA DE FRICTO DOLCE Port, APPELSINE SUSSER POMERANZENBAUM, ORANGENBALM, Germ , PORTOGALLO, Gr , LARANJAS, Rus |

1232

Var jst turantium.

1233

CITRUS Aurantium

The Sweet Orange.

Vera -- Nêrangî, sangtara, ndrenj, ndringî, ndrengê, sunîhura, amrilphol, kumla nebu, livvo ; Kımla nembu, ndrungî, ndrengê, Beng, Suntali, Nepviz Sanjara, ndrangî, ndringî ndranî. Po Ni

fandu,

1013 / Lieste, Lerjumers, 1893 wayour Cyclop Emith, Dic, 3003 Treasury of Botany, Ker Off Guile to Museums 25 Kew Off Guide to Bot Gardens and Arboretum 64, Yournal Agri Horts Soc, old

Habitat —Cultivated in most parts of India, but specially so in the Provinces, and to a small extent in Nepāf, Sikim, and one or two other Himalavan stations. In flurma Kurz says, the orange is met. it is the part of the country of

in all bear

salle
Santgur near Villore, and the Northern Circars, are famous for their oranges but there are large tricts where none or inferior kinds only are produced. In India the fruit generally ripens between December and March, according to the churte of the locality. A vanety which flowers twice a year (February and July), and yields two crops—the first from November to January, and the second from March to April—is grown at Nagpür (Firminger's Gardening, 2nd Ed., p. 223)" (Brandis)

t Nagpur (Firminger's Gardening, 2nd La, p 223) (Dranus)

HISTORY.

the idea that the sweet variety of the orange came from China and - 1d into India, perhaps towards the begin-

time at Libon 1 four time point, the cultivation of the sweet orange spread to Rome and along the Mediterranen DeCandolle, however, is of opinion that the sweet orange may have reached Europe before the

## The Sweet Orange.

CITRUS Aurantium

HISTORY.

date just given, but of inferior quality, so as not to attract the attention . with to it reeks , and 1 the ether ze to :

that the orange is a native of China; the names given to the various forms are represented by a particular character which occurs in the most ancient Chinese writings, whereas the names given to the pumelo and the lime are of a much more modern character.

Cintra-a town famous for its fruits. Yule-Burnell say: "As early as the beginning of the fourteenth century we find Abulfeda extolling the fruit of Cintra. His words, as rendered by M. Reinaud, run: 'Au nombre des dependances de Lisbonne est la ville de Schintara; à Schintara on recueille des pommes admirables pour la grosseur et la gout." be doubt-

mperor of which is. the fruit. would acbut for the is adhered

to the fruit in question" Numerous passages might be quoted in support of this: "The Senetereh . . is another fruit the citron (Tarang), but the skin of 6), Memoirs, page 328). Kirkpatrick, in eaks of the Nepaul Santola orange as

· which, he says, "I take to be a corrup-

### CITRUS Aurantium.

## The Sweet Orange.

## HISTORY.

tion of Sentereth, the name by which as in lar species of orange is known in the Upper Provinces."

The sweet and the butter cultivated oranges are, 1 y some writers (among whom are the leaened authors of the I is er er it stated to be derived from the same stock. The " " . India settle native country of the grange ...

The belief (tell very Il tter."

I support the epinions published in Ur. Bonavia's paper alunion to above. Referring to the small - 1 - it tead and known over the North-West

The orange is called Sunfoof Butwal orange The chils." Mr. J. H Fisher. the Raish of Kulabandi (a il Provinces) brought him inge trees, which grew

at an that they were

~ Lnown

limes

æ e. 111

earlier

certain places in the illicity a Mr. Fisher adds, however. that as he was unable to sisit the locality he "never had an opportunity of seeing these wild trees" Both the list mentioned writers appear to ---- but it would be unrife to inter, even from the

, indeta, cc

on the supposition, as in the case lant. The difficulty confronts a of the pine-apple, man a hasty inference that a wi to the Sanskrit writers and batter oranges but not

CULTIVA-

CULTIVATION OF ORANGES IN INDIA -There are two great centres of sweet orange cultivation in India-th enetern side and Nagpur in the cent

at and the trict

ar central Him nay i all

Darreeling an orange at

oranges of Ceylon Dr Bonavia refers the sweet oranges to four cultivated races, two of which should most probably be referred to C nobiles, namely, the Mandarin and the blood red Maltese like orange found at Gujiranata. The Maltere orange proper has recently been introduced into India, and is being cultivated at Jounpore and other localities. From an industrial

### The Sweet Orange.

CITRUS Aurantium.

or economic point of view, it is of little consequence whether, a sweet oringe be referable to C. Agrantum or C. nobills; we may therefore follow Dr. Bonavia, since that authority has very strikingly exemplified the manner in which continental India might have a continuous supply

CULTIVA-TION THE RACES OF SWEET

Race 1st, Santara. 1234

ber. December, and Innurry.

Vern—The following are the special vernacular names mentioned for this

BENG:
kampho
tenga,
latter:
two cro
and the

Pungtec Delin

Poona; Aithli, Man; Aonda narun, Sing

Mr. Morris (in his Godivery District, Midras Presidency) says: "a

entirely ant fact, the word A imata being thus clutted as both a bengal and a Telegu

word Dr. Bonavia says that in Assam the word Kamala is believed note the Editor of ome from Kumilla,

nese derivations is

orange of the central tracts of India came from Assam, and carried its name with it. The plant could scarcely have been indigenous to both the same name in two languages.

far it is correct to throw all the above

nge, for example, has a thick rind and is very spongy, more so than either the Khasia or Nagpur orange. The orange with a thick rind, met with in the Godavery District, Mr. Morris informs us, was introduced by the Dutch, and to this day bears.

Race 2nd, Keonla 1235

darker coour, thinner, and Johnstve (e.g. Jacket not loose). This is the orange that comes latest into the Calcutta market. It is plucked about January and February. The Keonla orange is, perhaps, note extensively diffused over India than the Santara. It can stand a greater amount of heat and is therefore the orange of the isolated and private orchards over the greater part of the country. It is never so sweet as the Santara orange, but its bitter sweet flavour is perhaps all the more grateful at the season of the year at which it is available.

Person of the year at which it is available

Vernacular names in the various provinces of India for this peculiar

form are not available

ČOTRUS Aurantium.

The Sweet Orange.

RACES OF SWIFT ORANGES. Before preserding to the use the third class of sweet oranges referred to by Dr. Bonawla it may be as well to refer to another author. Mr. Atkinson mays of Kumnon: "The sweet orange is the form most usually cultivated, and there are several local virieties, some named after the localities in which they are produced, and others according to specife local distinctions in size and flavour. The three more common virieties cultivated in the plann are the Sindary, Ndrasnyl, and Kumla or Kumla. The list is the smallest and most esteen ed." The writer feels strongly inclined to suspect that Kumla, Kumla, Kumla, and even Kamali art names detired from a common source, and that the oranges they represent should be isolated from those designated Sant are or some derivitive from dubts may be enter-

unmutakably indigenous cultivated plant, that names so much alike as those given above, should occur in the most remote parts of India and be used by peoples as distinct anti-ropologically as they well could be. It may be further suggested that the thek skinned oranges may be found to correspond to Mr. Atkinson's second clars Naranga. That writer concludes his account of the Himilianan oranges as follows:

"The orange has been found periodes at Bigewar in Rum.

ection with any other

petioles at Bigeinar in Kum, and with globose fruits, naked late, acuminate leaves in Garhi.

possible to avoid the conviction that too strong opinions have, by all writers, been advanced as to the Himslayan home of the sweet and butter

Race 3rd, Malta 1236

in both cases possessing a peculiar and distinctive odour which at once isolates these forms from the oranges already described. They come into season after the were an effort to be of the blood red for ,

The Sweet Orange

CITRUS Aurantium. RACES OF SWEET

1237

the hot season the time when these fruits would be most accentable Speaking of the Gujranwala oranges Dr Bonavia says Colonel Olarke introduced these from Malta in 1852-56 Dr Bonavia himself in-troduced the same orange into Lucknow in 1863, and Mr C Nickels established the Jounpore stock in 1872 Prior to the Mutiny blood oranges were grown in Lucknow, so that there must have been earlier introductions than those mentioned above From these centres, however, the cultivation of the red oranges has been greatly extended, so that they are now met with in most districts in Upper Inda At Poona a blood orange s maname given zıbar to a similar

but from Taniore a r u a parts of India, Dr Bonavia very the absence

naturally arrives at the conclusion that the better qualities of red oranges must be modern introductions

Speaking of the blood oranges of Gujranwala, Dr Bonavia says "the specimens of blood oranges sent to me by Mr Steel, Deputy Commissioner of Guiranwala, in my opinion, are the best oranges that I have The pulp is of the orange claret colour Many of the tasted in India specimens were full blooded, and smeared externally with a blood tinge. The juice was simply nectar like. In short, their flavour was, in my opinion, simply perfect I thought them equal to that of the blood oranges of Malta." "Mr Steel states that the soil on which they grow is a stiff clay with plenty of kankar in it. But the real secret, he thinks, is

Here there is a chance of creating an extensive trade in blood oranges, as a speciality of Gujranwala They are not only exquisite oranges. which if, properly packed, would bear long journeys, but they are late oranges, and therefore would not a

.. , .. u would

'larch Last year, some by careful July " pac 200

writers ly met

1238 he true , which it used by most writers the a special Chinese development from the same stock as the

Maltese orange In a further page particulars will be found regarding this orange, suffice it in this place to add that in Dr Bonavia's opinion the true Mandarin, while found in Ceylon does not exist in India Mr O B Clarke, on the other hand says the cultivation of this form is capidly extending in the Khasia hills Dr Bonavia recommends its introduction in the highlands of Bengal " where it would be out of the influence of the hot winds," which have killed or rendered uscless all the plants grown in Upper India

Having now briefly indicated the chief forms of sweet oranges met with in India, the present article may be completed by giving some idea of the orange industry at the two great commercial centres-Silhet and

I -- ORANGES OF SILHET AND ** F 1' paper appeared on this sub Society of India, from the per

Slihet 1239

Race 4th

Mandarin

342 CITRUS The Sweet Oranges of Silhet. Aurantium. DUCTION IN INDIA. Series, 1840. 4 .... the " Orange such reports \$ 0.000 to 1 ^m_ 0 الأراج وأحداث والمراوية والمراوية tion, collection, and transport are next fully disposed et. Indeed, so admirably has Mr. Brownlow fulfilled his task that any abridgment of his paper must mar its usefulness. The limited space at the writer's disposal precludes the reproduction of the entire paper, and the reader who may be specially interested in this subject is therefore referred to the original; the following abstracts, bowever, may be found useful:-Soft. Soil .- the Brownlow shows that the presalence of nater below the roots is a feature es' water must not be s such that the water quence lest uncultivated. Here, in one large connected piece of perhaps 1,000 acres, is the garden that supplies a great part of eastern as well as western Bengal with oranges; I say perhaps 1,000 acres, because the area ler the shade of orange when, as in December Of the sample received 100 parts dued at 212 h. = 97'27 or 102 o ds received equal to dry 100. Soil dried at 212°F. 6.00 Alumina 4 93 Peroxide of fron .10 Lime Magnesia *13 *80 Alkalies (by difference and loss) "15 Silica solution 12'20 These dissolved by II. Cl. 3'49 5'66

78'56 100

The Sweet Oranges of Silhet.

CITRUS Aurantium.

"It will be observed that this is a very siliceous soil, proceeding from the decomposition of siliceous rocks alone It contains no carbonate of limes and is a very open and porous soil."

ORANGE PRO-DUCTION IN INDIA.

CULTIVATION —The seed is sown in January and February, thickly in troughs or boxes in about 6 inches of soil. These seed-boxes are raised above the height pigs could reach them, and are often protected by nets from rats and squirrels The seedlings are pricked out during the ensuing rains; but in doing so the boxes are broken up and the earth shaken away from the roots, so that there is absolutely no injury done to the tap-They are transplanted into a nursery in the grove; here they

Cultivation. 1240

weeded. ris . is to be spent

COLLECTION AND PRUNING -Each collector has a ladder, about 20 Collection and feet long, made of light bamboo. A coarse net bag, held open at the mouth by a cane ring, depends on his back by a strap passed over the right shoulder and chest. Into this he throws the oranges and before descending he removes the withered leaves and dead branches, or cuts out boughs injured by the loranthus parasite that does such damage to the plants. "The orange trees receive no other handling than the above; they are never systematically pruned or thinned, and are allowed to retain just what fruit they set, and yet the crop turns out wanting neither in size, flavour, nor abundance. Contrast with this the claborate summer and winter pruning of the Trench gardens and the systematic cultivation and manuring of the Genoese, and yet with all their labour they produce a fruit inferior in quality and beyond all measure dearer in price than that produced by the comparatively thriftless and indolent Khasia" Boys are employed with pellet bows to keep off the crows, squirrels, monkeys, hornbills, and other animals destructive to the crop. All the fruit which falls to the ground by wind or otherwise is gathered "every morning, peeled and given to pigs and dogs, and it is not a little remarkable to see how the dogs have come by habit to relish" this food

1241

TRANSPORT TO THE PLAINS -The oranges so collected are taken down the river in long canoes or dug-outs and sold at Chuttuck. They are counted in fours, 750 for male as the conference of the delicate finer qualities with this confound. Transport 1242

to endure the rough mentions that it Philli Bizir, that it Philli Bizir, quality are sold by battering for rice, fish, &c, to the Muhammadan boutmen at h6 2 son, being h4 less than the oranges at the Shalla groves, and yet this includes the cost of cultivation, labour of plucking, and carriage to the river

TRADE 1213

TRADE IN SILIIFT ORANGES.

Mr G. Stevenson, Deputy Commissioner, Silhet, has furnished the following tabular statement -

					Bost T	RAFFIC
					Q ar' 'y in	Value in Ra
199,291					1,20,3,5	2.40 00/
1271-52					1,4' ()3	per la ma
1213-63					1,0 11	1,27 211
14.3-64					4,14, 73	2.27,00.3
1554 55		•			1,2 ,214	3-47.343

# CITRUS Aurantium.

### The Sweet Oranges of Silhet.

ORA	MG	£	r	R	ć
DÜ	ÇŢĮ			1	١

Series, 1869, 1 --- > the "Orange . new localities *io- --1i--- --

Soil.

precludes the reproduction of the entire paper, and the reader who may be specially interested in this subject is therefore referred to the original; the following abstracts, however, may be found useful :-

Soil .- Mr. Brownlow shows that the prevalence of water below the roots is a feature evidently favourable to orange cultivation, although this water must not be stagnant. The peculiar underlying pebbly stratum is such that the water percolates from the river below the orange groves and

quence left uncultivated. Here, in one large connected piece of perhaps 1,000 acres, is the garden that supplies a great part of eastern as well as western Bengal with oranges; I say perhaps 1,000 acres, because the area under cultivation is not known to the Khásia proprietors themselves." "One may walk for a good hour or two, always under the shade of orange ***** '41 - { va -1 ' ' 41 a '

find here." The climate and soil, in Mr. Brownlow's opinion, is that eminently suited to orange cultivation, and we may therefore reproduce Dr. Waldie's analysis of the soil, collected for that purpose by Mr. Brown-

low, from the Shalla plantations.
"Of the sample received 100 parts dried at 212°F. = 97'27 or 102 8 as Link at arms

received equal to dry 100.

		301	ı arı	eu n					_
Alumina .	_	_	_						6.09
Peroxide of iron	•		•	-					4 93
Lime	•	•	•	- 1	- 1				.10
Magnesia .	•	•	•		Ţ.				*13
Alkalies (by diffe	•	4	loan)	:	•	•		- :	*80
Silica solution	•		•	:	:	:	:		.12
There derait	1 4 1 14	LI	r)						12.50
•						٠.	•		3*49
I'									***
									5.00
									18.20
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ı t ade

CITRUS Aucantium.

The Sweet Oranges of Nagour.

TRADE.

Dr. Bonavia, commen' about 1,21,095 maunds of of rupees, in layourable yea to be equal to about 8,05 Bonavia further adds; small Taking 8,05,360 to

low, the figures would be 2,41,60,800, or about 210 oranges to the

maund."

Nattenn. II.—ORANGES OF NAGRUE IN THE CENTRAL PROVINCES.—We have 1244 already given several passages that refer to the so-called wild oranges both of Nepal and the Central Provinces It will only be necessary further to give here a borel account from the pen of Mr. J B. Fuller, as published by Dr. Bonavia, in order to place before the reader a comparative sketch of these groves to complete what has been said of the Khasia hills. These two localities represent the bulk of the orange production of India Mr. Fuller says :- "Within the last twelve years many new orchards have been planted in Nagpur, Kamptee, and other parts of the district, and orange cultivation is now spreading rapidly in other districts of the Province. There is a great demand for the Nagpur oranges in Bombay, and considerable quantities of the fruit are annually exported to this and other places. In the year 1885, 22,600

maunds of orange fruit were exported from Nagour station, out of which 21,400 maunds were exported to Bombas alone It is perhaps only necessary here to repeat that the North-West Provinces receive their supplies from Nepal, Delhi, and to some extent also from Nagpur Panjab, Madras, and Burma are practically dependent on local production from isolated orchards, Madras drawing largely from the Shevroys.

Properties and Uses-

Gum.-The orange tree is said to yield a gum of no importance sample was sent from Masulipatam to be shown at the Madras Exhibi-

1215

MEDICINE 1246

GUM

1- - - India treats the sweet and bitter dried outer portion of the RIND of

" I ne Munammagan writers describe the best kind of dranges as large, thin-skin

dry, the when fel

sugar, thæa, 7 checking

Oranges are considered to be alexipharmic and disinfectant; orangewater stimulating and refreshing. The essence is extracted by oil from the rind and flowers, and is used as a stimulating liminent," (Dr. Dymock, Mat. Med W. Ind.)

Ainslie makes the following remarks: "Oranges are in great repute amongst the Hindu physicians, who suppose that they purify the blood,

	CITRUS
The Bitter or Seville Orange.	Aurantium.
allay thirst in fevers, cure catarrh, and improve the appetite. A sherbet	MEDICINE.
in Inc lemor of or: addut rind pulverised and added to magnesia and rhubarb affords a grateful tome to the stomach in gout and dyspepsia. The roasted pulp is an	]
and the contract of the contra	
with eczema in the alof a libe dec and life or seen ill Hilliam Darwa's Food-buted over market, grown in and about Delhi is on the average larger, but more spongy,	F00D. 1247
orange tree, at the convent of St. Sabina at Rome, dates from the year 1200. The produce of one tree ranges from 500 to 6,000 fruits a year, and the tree sometimes grows to a height of 50 feet, with a trunk 12 feet in circumference.  Structure of the Wood,—Yellowish white, moderately hard, close and even-grained.	]
Var. 2. Bigaradia, Fl. Br. Ind., I., 515. (For var. 11t, see p. 335 and for 3rd, p. 3d.). Botanical Diagnosis — Petole short-winged; flowers large, strongly scented; rind very aromatic, pulp butter. THE BITTER OR SEVILLE ORANGE; BIGARADIER, Fr.; ARANCIO FORTE, II.; POMERANEL, Ger.	Var. 2. Bigaradia. 1249
Syn — C. VULGARIS, RESO. C. BURIFOLIA, Perr. Habitat.—The butter orange is a very extensively grown in the warmer parts of the Mediterranean, especially in Spain and Malta. In India it does not seem to be cultivated except in gardens, but it is believed by the military from Garhwal able that its area extends net almost entirely from	
Marmalade is chiefly made from the rind of this species, but it is doubtful whether Indian-made and the state of the state	1250
OIL or NERGLI. Oil and Perfumery.—Essential oils are obtained from most of the species of the Curus family. Sir W. O'Shaughnessy, speaking of the sacet C. 1251	oiL 1251

OITRUS Aurantium	The Bitter or Seville Orange
Surantiun	i Serial Orange
PERFUMERY	oranges, says that "the leaves are rather bitter and contain essential oil. A still more fragrant oil, called oil of nevols by the perfumers, is afforded by the flowers." Plesse, in his work on Perfumery, describes neroli oil, and says that the best quality is obtained by distillation, with water, from the flowers of Citrus Aurantium (the sweet variety). According to the same author, an inferior quality of neroli is derived from the blossoms of Citrus Bigaradia (the bitter variety). This oil is called Essence de Neroli Bigarade, and the oil from the flowers of the sweet variety bears the name of Essence de Neroli Petole or Neroli Bouce. This statement is approach, however, to the opinion given by almost every other water, the neroli out from the sweet orange being used only as an adulterant to that from the litter. The fresh flowers of the Bigaradia orange yield on distillation Essence de Neroli Bigarade and if the septls are carefully removed from the flowers the essence is known as Essence de Neroli Petole The latter flowers the essence is known as Essence de Neroli Petole The latter is finer and much more expensive than the former. From the seeds
1253	Estince de Petit Grain used to be manufacturea, but this is now entirely distilled from the leaves and twigs it is therefore a missioner to call it Estine de Petit Grain. Similar essences are distilled from the leaves of most species of Citrus, and these are all used together with essential oil of orange leaf to adulterate neroh ofto. The witer which passes over with the oil during distillation constitutes, when separated from the oil, or night force? Water (see below)  The extraction of Neroli oil is chiefly carried on at Grasso, Cannes, and Nice, in South France, also in Algeria. In France, about 20 occur of the flowers are annually distilled. The sweet variety yields but half the amount of oil which may be obtained from the butter, as much as 0 oper cent being often obtained. The oil of neroli is commonly adulterated with bergamed and fetit grain. According to Fillekiger, the neroli commonly sold contains \$\frac{1}{2}\text{the Bissuec de fetit grain, }\frac{1}{2}\text{the essence of berg timot, and \$\frac{1}{2}\text{the of true neroli.}} Fine neroli oil is brownish, of most fragrant dodour, and bitterish aromatic flavour, specific gravity, at 11°C, being o \$88\text{till fine neroli of test paper.}
Nerell Cam- phor 1254	When inved with alcohol it displays a bright violet fluorescence quite distinct from the blue fluorescence of a solution of quinne.  Netoli Camphoti.—The authors of the Pharmacographia obtained by distillation from the oil a very small amount of camphor called Neroli Camphoti, and they state that they were unable to obtain any similar substance from the oils of bergamot, petit grain, or orange peel.  Uses of Neroli Oil —Oil of neroli is employed almost exclusively in perfumery The "petide" and the 'bigarade neroli are used to menormous extent in the manufacture of Hungary water, and Eau de Cologne.
1255 1256	and other handkerchief perfumes. The "petit grain" is mainly consumed for scenting soap.  OTHER PERFUNES —The flowers by infusion in a faitly body make an admirable pomatum, the strength and quality varying according to the number of the strength and quality varying according to the number of the strength and quality varying according to the number of the strength and perfuse. By digesting
1257	orange flower pomatum in rectified spirits in the proportion of from six pounds to cight pounds of pomade to a gillon of spirit for about a month, the extract de fleur d'orange is obtained, a handkerthef perfume sur passed by no other seent. In this state its odour resembles that of the fresh flowers so much that with closed eyes the best judge could not distinguish the scent of the extract from thit of the fresh flowers (Priest).  Orander flowers Warffe —This san important article of manufacture, among the distillers of essential oils. It is largely used in pharmacy in three year three sorts of orange-flower witers found in commerce. The first is distilled from the flowers, the second is made with distilled water.

The	Bergamot Orange	CITRUS Aurantium.
(Phormacoa)	' led from the leaves, the stems, and the ' (Fiesse) "As met with in come of a family green sh yellow tinge delicious odour and a bitter taste' Largely made at Messina, and	
Bigarade and Essence de Por "These essences are but I ing and in perfumery (P/ Var 3 Bergamia, Fl Br Ind The Bergamor	little consumed in England in liqueur mak harriacog)  1 515	Var 3 Bergamia 1258
METTA var DC Prod Vern -Limun nibu li	var BERGAMIA W & A Prodr 98 C LIM r 1 539 mm, HIND DUK Nthu BENG Limbu MAR Limb SIND (according to Stocks). Elimich cham that in Jonakam phalam SANS, Limbu PERS, Dehi, SING,	
References — ~ Voigt Hort Pharm Ind 15th Ed 100 D Spens 231 Perfu nery Dict 40 T	г г н же 1 9 m i г е м ,	1

Habitat -The Bergamot Orange is cultivated near Reggio in South Calabria in Sicily and in the south of France, but it is only rarely met with in India It may be doubted how far the above vernacular names given to it are correct. The fruit when full grown is still unripe and green they are sometimes known as green oranges. Some of the green oranges met with in India (and already alluded to p 340) may belong to this variety

#### BERGAMOT OIL

Oil -The r nd of the fru t yields on express on the oil known under the name Bergamot For th's purpose the fruits are used and one hundred of them are sa'd to produce about three ounces of the otto Formerly the oil was extracted by distillation or by expressing the rasped rind but these processes have been superseded by the fouelle a special instrument described in Spons Encyclopædia page 1457

General Characters of the Oil -The oil as produced by the mach ne

prorant vitv Ít

o turpen Pharmacog)

Chemical Composition -The authors of the Pharmacographia say "If essential oil of bergamot is submitted to rectification the port ons

CHEMISTRY

OIT.

1259

340	Dictionary of the Economic
OITRUS Aurantium.	. The Bitter or Seville Grange.
PERFUMENT.	oranges, says that "the leaves are rather bitter and contain essential of A still more fragrant oil, called oil of neroli by the forests," Piesses, in his work on Perfumery, describes neroli oil, and says that the best quality the flowers of Citrus Auraniis same author, an inferior qualit Citrus Bigaradia (the butter vir Bigaradia, and the oil from the flowers of the sweet variety bears the name of Essence de Nerols Pitals on Nerols Loues. This statement is opposed, however, to the opinion given by almost every ether writer, the nerols often the sweet variety bears the flowers of the flowers of the Second and adulterant to that from the butter. The fresh flowers of the Bigaradia orange yield on distillation flowers.
1253	the is fit The latter is fit The latter is fit The seeds Ettence de Petit Grain used to be manufactured, but this is now entirely distilled from the leaves and twigs; it is therefore a misioner to call it Estence de Petit Grain. Similar essences are distilled from the leaves of most species of the old during flower II after (see below)  The extraction of Neroli oil is chiefly carried on at Grasse, Connes, and Noce, in South France, also in Algeria. In I rance, about 20,000 exit of the flowers are annually distilled. The sweet variety yields but half the amount of oil which may be obtained from the butter, as much as o 6 per cent being often obtained. The oil of neroli is commonly adulterated with bergampt and petit grain. According to Fluckiger, the neroli commonly sold contains it is Essence de petit grain, it is essence.  bitterish aromatic utraft to test paper.
Neroll Cam-	fluorescence quite ne phia obtained by
1254	alled Nevoli Cam-
Eau de Cologne 1255	tront the die of Neroli Oil - Oil of neroli is employed almost exclusively in Dises of Neroli Oil - Oil of neroli is employed almost exclusively in perfumery. The "petale" and the "biggarade" neroli are used to an enormous extent in the manufacture of Hungary water and Ean de Cologne and other handkerchief perfumes. The "petal grain" is mainly consumed for scenting 50ap.
1256	orange-flower pomatum in rectified spirits in the judgesting of from six
1257	anufacture, pharmacy "There are three sorts of orange-flower waters toung in to first is distilled from the flowers, the second is made with distilled water

# The Bergamot Orange.

CITRUS Aurantium.

and neroli, and the third is distilled from the leaves, the stems, and the PERFUMERY. and neroit, and the third is distilled from the leaves, the stems, and the young unripe fruit of the orange tree." (Presse) "As met with in commerce, orange-water is colourless or of a faulty greenish-yellow tinge, almost perfectly transparent, with a delicious odour and a bitter taste."

(Pharmacor) ESSENTIAL OIL OF OR also the south of France

process, partly from the E tugal Orange, the scarcely ripe fruit being in either case employed The oil made from the former is much more valuable than that obtained from the latter, and the two are distinguished in price-currents as Essence de Bigarade and Essence de Portugal.

"These essences are but little consumed in England, in liqueur-making and in perfumery." (Pharmacog )

Var 3. Bergamia, Fl Br Ind , I , 515

THE BERGAMOT ORANGE

Syn .- C AURANTIUM, var BERGAMIA, IV & A Prodr, 98; C LIM-PTTS FOR DC D

Lamya-sı, or tam buyu-sı, Burm References -P- --Voiet, Hort Pharm Ind , 15th Ed , 1002

Piesse. Perfumery Ivo, or, opens, Light, 141), Bullour, Cyclob, Smith Dict, 49, Treasury of Botany, Ure, Dict of Arts and Manufactures Habitat -The Bergamot Orange is cultivated near Reggio in South

Calabria, in Sicily, and in the south of France, but it is only rarely met with in India. It may be doubted how far the above vernacular names given to it are correct. The fruit, when full grown, is still unripe and green, they are sometimes known as green oranges. Some of the green oranges met with in India (and already alluded to, \$ 340) may belong to this variety.

BERGAMOT OIL

Oil .- The rind of the fruit yields on expression the oil known under the name Bergamot For this purpose the fruits are used, and one hundred of them are said to produce about three ounces of the otto Formerly the oil was extracted by distillation or by expressing the rasped rind, but these processes have been a percent of the other

a special instrument described in Spons' General Characters of the Oil -The

referred to above, is of a greener tint th

cess "It is a clear, limpid liquid, with a peculiar and very fragrant odour, and a bitterish, somewhat warm, aromatic taste Its specific gravity varies from 0 86 to 0 88, and its boiling point from about 361° to 383° has a slightly acid reaction, is mixible with rectified spirit, oil of turpentine, and glacial acetic acid, and is dextrog) re" (Pharmacog)

Chemical Composition - The authors of the Pharmacographia say: CHEMISTRY. "If essential oil of bergamot is submitted to rectification, the portions

C. 1260

Var. 3 Rergamia

1258

, 13,

Subb

Beng

OII. 1250

CITRUS The Citron. Medica. The sweet lime (C. Limetta) appears to be the southern manifestation of the species, and the writer would be disposed to look for the lemon in the far east, if not in China, even although the Chinese names for it do not occur in the ancient writings. As a cultivated plant, it may have spread from China to India before it had attracted much attention in China itself Although not wild, the plant is more frequent in Assam than in Bengal, and it is possible it may have entered India across the Chino-Assam frontier. This species includes as varieties the Citron, the Lemon, the Sweet and the Sour Lime. Var. 1 Medica. Var. 1. Medica proper. THE CITRON, CEDRAT-TREE, ADM'S-APPLE, Eng., CEDRATIER, . I270 CITRONIFR, Fr.; CIDRATO, CFDRO, II.; CIDRO, Sp.; CIDREIR, Port. / CEDRATEN, CITRONENBAUM, Germ. Considerable difference of opinion prevails as to the origin of the word Citron. It is presumed that the Median apple was synonymous with the Syn .- C AURANTIUM, var MEDICA, W. & A Prodr ; C. MEDICA, tar. A. Linn , CITRUS MEDICA, Risso. Vern.—Bifaura, limbu, kutla, bara nimbu, turanj, nimbu, limu, Hino. maha-Duk ; ı, nará bitaijapura ARAB . khara, shon takhava, Bunn ; Sedaran, Sing R vS infound Hill," the Ichasia

ar and along

## The Citron, The Lemon.

CITRUS Medica.

History.-The citron is supposed to have been introduced into Greece and Italy from Persia and the wa

Theophrastus as abundant in

may have been known to the Captivity According to Gallesio it was introduced into Italy about the third or fourth century. The Jews cultivated citron when under the Roman rule, and used the fruit, as at the present day, in the Feast of Tabernacles, each person bringing a citron in his hand. Dr Royle found the species growing wild in the forests of Northern India, and, as already stated, it may therefore fairly be conjectured that the original home of the citron was in India. It has now spread over the whole of the civilised world, and even in cold regions it is cultivated under artificial heat.

Gum -Said to yield scantily an unimportant gum Sent from Ma-

sulmatam to the Madras Exhibition in 1855.

Oil -The flowers yield on distillation a very fragrant oil resembling nerols, which is chiefly used for the manufacture of Hungary water. Another perfume known as Cedrat is obtained from the rind of the fruit, both by distillation and expression The extract of cedrat is only the essential oil of citron dissolved in spirits, to which bergamot is sometimes added, (Presse )

Medicine. - Citron RIND is hot and dry and tonic; PULP cold and dry, SFEDS, LEAVES, and PLOWERS hot and dry , JUICF refrigerant and astringent. According to Theophrastus the fruit is an expellent of poisons

a

sedative (Year-Book, Pharm, 1874, 623) Special Opimons - 6 "The rind is made into a marmalade and is an antiscorbutic" (Surgeon-Major A. S. G Jayakar, Muskat) is made into preserve and is used for dysentery" (Surgeon-Major

h India as large, , aromatic, pulp

scanty, sub acid The rind makes good comfit, the pulp is also preserved in sugar. Both fruit and preserve are somewhat bitter to the taste. The rind of the fruit candied is well known as a delicate sweatmeat. Atkinson says the wild fruit is used for pickling (khatai) candida Rind Dr. Bonavia remarks that cutrons are very little used in India, except for 1281 medicinal purposes "On the Western coast of India, they have many lekkles." large varieties, and at Mangalore they eat the thick sneet skin after pecling off the bitter rind In Lucknow, and in Rampur, Robilcund, and other places they make a preserve of the thick skin of the citron which they call 'Turung,' All the citrons, both sweet and sour, have a dry pulp,"

Structure of the Wood -White, moderately hard Domestic Use .- The fruit put amongst clothes keeps away moths.

Var. 2 Limonum, sp. Risso. The word lemon is from the Arabic limin, and this, through the Persian, is the Hindi limin, limin, or nimbin, probably adopted by the Sanskrit people Much stress is by authors laid upon the fact that the

ult to see ric name obability referred

b trá nimbá or large nimbu/

. . oquerery opone i of as the C. 1286

1272

GUM 1271 01L

MEDICINE. 1273 Pulp. 1274 Seeds 1275 Leaves

1276 Juice 1277 Marmalade. I278 Food Fruit 1270

Comfit. 1280 1282

Preserve made of skin. 1283 TIMBER 1284

DOMESTIC 1285 Var 2 Limonum

1286

350	Dictionary of the Economic
CITRUS Medica	The Citron.
	The sweet lime (C Limetta) appears to be the southern manifestation of the species, and the writer would be disposed to look for the lemon in the
	Although not wild, the plant is more frequent in Assam than in Bengal, and it is possible it may have entered India across the Chino Assam frontier  This species includes as varieties the Citron, the Lemon, the Sweet and the Sour Lime
Var. 1 Medica. . 1270	Var. 1. Medica proper.  The Citron, Cedrat-tree, Adam's apple, <i>Lng</i> ; Cedratier, Citronier, <i>Fr</i> , Cidrato, Cedro, <i>II</i> , Cidro, <i>Sp</i> , Cidreir, <i>Port</i> , Cedraten, Citronenbaum, <i>Garm</i>
	Considerable difference of opinion prevails as to the origin of the word Citron. It is presumed that the Median apple was synonymous with the
	·
	Syn — C Aurantium, war medica, W & A Prodr, C. medica, var A, Linn, Citrus medica, Risso  ——————————————————————————————————
	" or auti kash mimers ast gerpoke 1280

# The Lemon. The Sour Lime. &"I.emons, as well as other fruits of the same order, contain a principle-hesperidene By some chemists this substance is described as bitter and crystalline, and by others as tasteless Gladstone obtained from oil the flowers of Citrus decur of Chemistry, Calcutta) ed from lemon or lime juice It occurs in colourless crystals, is very soluble in water, less soluble in rectified sourt, and insoluble in pure ether. The chief use of citric acid in medicine is in the preparation of effervescing draughts and refrigerant drinks, dose being from ten to thirty grains, 6" The amount of free citric acid contained in Indian limes appears to be somewhat less than that found in the varieties cultivated in Europe, and varies from 25 to 30 grains of u (Surgeon C 7 H Warden, Profess Lemon Syrup -In the Pharmac are given for the preparation of th peel two ounces, lemon juice, strained, one pint, refined sugar, two pounds and a quarter Heat the lemon juice to the boiling point, and having put it into a covered vessel with the lemon peel, let them stand sloughing of the mucus membranes I have given 12 ounces a day in apparently hopeless cases with success "(From a Contributor)" (Lemon oil mixed with glycerine is applied on the eruption of acne '(Sargon a Contributor)") (Lemon oil mixed with glycerine is applied on the eruption of acne '(Sargon and enunpowers used tomosilis for conand gunpowder used topically for scaley, Rajshahye) ' The fruit in the form of the spleen" (Surgeon J C Penny, Amritsar) Food -The lemon juice is used largely in sherbets and cooling drinks The fruit is also pickled Var 3 acida. THE SOUR LIME OF INDIA Syn -C Acida Razh Fl Ind , Ed CBC 589 (Roxburgh appears ns) The C Limetta, Remedies) as having and not to the South If this proves correct Vetn -Lebu, nebu limbu nimba liman n ba, lima Hind , Lebu nebu, time the service of t Jambira limpaka, nimbuka Limun, limue hamis nimu, li Thanbaya, samya si, tambiya si, Buru, Dehi, Singh

CITRUS Medica.

MEDICINE

Citric acid. 1203

Syrup.

1294

FOOD 1205 1200

References —Brandis For Fl 52, Stewart, Pô Fl, 29, DC Origin, Cult Fl, 179, U C Dutt Mat Had Hund, 225, Annile, Mat Ind. 1, 133. Altinum Him Dut, 710; McCann, Dyes and Tans Bengal. 159. Kew Off Guide to the Museum, 25, Kew Off Guide to the Bot Gardens and Abrotlem, G.

Dictionary of the Fron mie
The Lemna
hydrophone gas, whereas by the same tres ment of of trepen no 2" its the 4" decompound C ₀ H ₀ and H Cl" (Fourth o 1 p. 1). Properties and Ures—become of himm is used in preference in Cases again Physics easy "Lemon of a min be freely will in cm" on a majoremus closes and curvais, for perfuming pant a
for the mosery. I from a rapid osalata natabalil not be used by performing prease, as at nose as rether than ediers, so all fact a train of an idelenge person may apperformed with a trace person. In the manufactar of all not manufactar for persons of a train edge at the first and a train edge at the first persons of all trained and mail after. There are all a consumption of onto other most in the manufacture of easily left in the as multime and caree native when a sent of a grant a sum time and caree native when a sent of a grant a sum time and caree native when a sent of a grant a sum time and caree native when a sent of a grant a sum time and caree native when a sent of a grant a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and a sum time and caree native when a sent of a sum time and a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time a sum time and caree native when a sent of a sum time and caree native when a sent of a sum time a sum time and caree native when a sent of a sum time and caree native when a sum time
bering lavalural appear in which titlered?  Mediche There are three it not present the feut ment in thich  Flares are after a (s) the concept titlered log (s) the entitlered for the soft and after a (s) the concept titlered log (s) the placed there are the soft are an are the majority (s) the jected there are the soft are an are the majority are less majority and an excite a soft are an are the soft are after a system in a soft are a soft are are as a soft are an are a soft are are also are also are also are also are also are are also a

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# The Lemon; The Sour Lime.

CITRUS Medica.

§"Lemons, as well as other fruits of the same order, contain a principle—httperident By some chemists this substance is described as bitter and crystalline, and by others as tasteless. Gladstone obtained from oh

which he called hesperidene. the flowers of Citrus decur of Chemistry, Calcutta)

It occurs in colourless crystals, is very soluble in water, less soluble in rectified spirit, and insoluble in pure either. The chief use of citric acid in medicine is in the preparation of effervescing draughts and refrigerant drinks, dose being from the 10 thirty grains.

Citric acid. 1293

(Surgeon L ' HI Warden, Professor of Chemistry, Calcusta)

L'emon Syrap—In the Pharmacopéra of India the following directions are given for the preparation of this substance: "Take of fresh lemon peel two ounces, lemon juice, strained, one pint, refined singar, two pounds and a quarter. Heat the lemon juice to the boiling point, and having put it into a covered vessel with the lemon peel, let them stand the sugar in the filtered liquid.

1 weigh three pounds and a half

5yrup. 12**9**4

Most useful in disentery with sloughing of the mucus membranes. I have given 12 ounces a day in

soughning of the mucus memoranes. I have given 12 ounces a day in apprientily hopeless cases with success" (From a Contributor), "Lemon oil mixed with glycerine is applied on the eruption of acne" (Surgeon

Amritsir)

Food -The lemon juice is used largely in sherbets and cooling drinks.

The fruit is also pickled.

Var. 3. acida.

THE SOUR LIME OF INDIA.

Syn -C Acids, Rosh, Fl. Ind., Ed. C.B.C., 650 (Roxburgh appears include under this not mercely the Sour Lime but all Lemons). The C. Limetia, Associated by many authors (e.g., Dr. Rice in the Remedies) as having a "very and even acras, proce, must refer to the plant and not to the South the 3 months may require to be rearranced." If the process tower the 3 months may require to be rearranced.

Veto — Leis, neis limin, ninis liman, niiš, lima, liino ; Lein, neis, limbu, minis, pati neis, kapy mini, kapis minis, canvalmeis, tava, neis lievo on mis, canvalmeis, tava, neis lievo on hone; kuts himmes, lievo on hone; kuts himmes, lievo on hone; kuts himmes, lievo on hone; lievo on hone

References - Franks, For Fl. 52; Stowert, Ph. Fl. 57; DC. Overe, Cal. H. 179, U.C. Datt, Ma. Med. Hand, 179; Ann. o., Mor. Lat., Lat. Militaries Him. Dud., 710; H. Cana, Dres and Tant, Horgel, 165; Acr. Of. Castle to the Mastern, 25; Acr. Of. Castle to the Mastern, 25; Acr. Of. Castle to the Mastern, 25; Acr. Of. Castle to the Park.

2 1 2

C. 1296

FOOD.

1295 1296

The Sweet Lime, The Sweet Lemon.	CITRUS Medica,
not a cillage in the whole of India where the kaghis-nimbi would not readily grow." "Although they are called limes, I believe them to be an end of the control of the cont	F00.2.
R1,695 Dr. Bonavia divides  Citron lemon y" "lemons proper," and a group of sour Citrus known by the name of gungolee and behave lemons	ļ
Var. 4. Limetta, W. & A., Fl. Br Ind, I., p. 515. The Sweet Line of India.	1301
Syn — C NOBILIS, Lour, as m Kurs, For Fl Burm, 1, 107; Wight, Ic.; 558, C LIMETTA, Russo. It might be asked, has the C LIMETTA, Fasso, sweet or butter faults. It the latter, it might be tweed as a rynonym control.  Very — Control of the control of the latter, it might be tweed as a rynonym very — Control of the control	{
170 : Alkinsc Junery, 150 Manuf, 111	
Habitat.—Commonly cultivated in most parts of India and Burma. Most probably a native of Southern India; Wight says it is indigenous at Kolagberry in the Nigut hills  Botaine Diagnosis —Leaves with unged petioles, flowers small; white, fruit globose or ovoid, shortly manuflate, rind with concave uscicles  The limes approach much nearer to the true oranges than do any of the other forms of C. Medica. Indeed, it is difficult to say how fat the published accounts of C. Limetta have become mixed up with C. Biggardaia, and the vernacular names given to both these forms, a many oranges of C. mobile by other.	
unior C. oigarana Medicine—§"Extensively used as refrigerant in fever and jaundice! (Surgeon F. C. Penny, Ameritar) Food—The fruit is both eaten fresh and after being preserved o cooked in various ways, but the jusce is not so much valued as that of the preceding variety.	- 1
Var. 5. Luma, W. & A., Fl. Br. Ind., I., 515.  The Sweet Lenon, Eng.; Lume, Fr. & Germ.  Vern.—See C. Livetia	1301
Habitat.—This form is very little known in India, and occurs only occa- india india to live time time, it is to ignit yenow, or out-oblong, with a long curved manufia rind with comex resides; pulp succes.	
C. 1304	

CLAUSEN Indica.	A The Mandarin or Maltese Orange.
01L 1305	Essential Oil.—Dr. Rico (1)5 that this oil is prepared at Squillace in Calabria by mechanical means.
1305	Citrus nobilis, Lour. THE MANDARIN ORANGE, sometimes also called the MALTESE.
1307	ORNGE.  Syn—Ctree seminers and C. Mertrolius  Vern.—Probably the same as for C. Limetta, it is the kán of China.  Habitat.—Cultivated in China and Cochin-China, where it appears to the lime of the cochinal china and Cochin-China, where it appears to the blood oranges of Gujranwala and of Jaunpore. New to European gardens at the beginning of the present century, but now cultivated plentifully in Sicily and Malta, known as fangerines in St. Michael's.  Botanical Diagnosis.—A moderate-sized tree; fruit uneen in surface, spherical but flattened on the top; rind very thin, dark reddishyellow; pulp almost blood red with a peculiar flavour; both leaves and fruit have the same odour.
NCOURAGE- MENT OF ULTIVATION IN INDIA,	
1308	which they are more picularly lamous. Ite urges that the blood oranges of Gujranwal's and Jaunpore should be fostered and developed, as these are not only the finest oranges met with in Indian, but would come into market in the hot season when no others are available, that the true
	that Lahore should give attention to its pear-shaped karna and the large, sour, and juicy lemon known in the Panjáb as guigui; and that Bombay should prepare to meet the Indian demand for its excellent pomelos. In this way, with extended railway communication, free interchange and a more constant and unroughout the year. "By rege scale, to those localities to would be trained, who would grow up conversant with the best modes of dealing with it, not only with regard to the cultivation and propagation, but also with the best modes of packing and preserving the fruit for a long time."
1	CLAUSENA, Linn; Gen. Pl, I., 304.
1309	Clausena indica, Oliv ; Fl. Br. Ind. 1, 505; Beddome; RUTACEE.  Syn.—Piptostruis unica, Dala; Dala; Gr Gibs, Bomb Fl, 29; Berecka, Intioh, Thw., Enum Crylon Pl, 40  ten. Myeng-langheityeus, Sino, Reference.—Lubo, U. Pl of Bomb, 33

### Ergot of Rye.

CLAVICEPS purpurea.

> TIMBER 1310

1311

MEDICINE Leaves

1312

1313

Habitat -A shrub or small tree, met with in the Western Peninsula

from the Bombay Ghats to the Anamally Hills, and also in Ceylon Structure of the Wood -Close-grained and hard, adapted for the lathe

Clausena pentaphylla, DC, Fl Br Ind, I, 503

Syn - Amyris Pentaphylla, Roxb Fl Ind , Ed CBC . 321 Vern - Rattanjole, surjmukha teyrur, HIND

References -Brandis, For Fl , 49 , Gamble, Man Timb , 59

Habitat - A decidnous shrub native of the Sub Himalayan tracts, from Kumaon to Nepal, especially the sal forests of the Duns and of Oudh Medicine - The bruised leaves are highly aromatic, and are believed to possess medicinal properties

## CLAVICEPS.

Claviceps purpurea, Tulsane, Fungi

THE ERGOT, ERGOT OF RYE, HORNED OR SPIKED RYE (Secale Cornutum), Bunt

Sym-Scienotium clavus, DC Ergotætia abortifaciens, Ouek OIDEUM ABORTIFACIENS, Berk & Br

References — Pharm Ind, 251, O Shaughnessy, Beng Disp, 631, 673, 76, Balfour, Agri Pests of India 61, 115, Fluck & Hanb, Pharma cog, 740, Benil & Trim, Med Pl, IV, 303, U S Dispens, 15th Ed, 5567

Dr R. Tytler (in the Cal Med Phys. Trans, 1831, vol V, p 441) reports that barley in the Upper Provinces of India is often affected with a disease very similar to, if not identical with, ergot of tye The diseased grain is spoken of as being very poisonous This same, or apparently the

wheat districts of [-being carefully

Medicine -produced within the paleze of the common rye, Secale cereale, forms the officinal part 'In medicinal doses ergot acts principally upon the muscular fibres of the uterus, causing them to contract strongly and continuand at an all r +1 .-ter

MEDICINE. 1314

tius, itolli ti e uterus.

"In overdoses ergot produces nausea, vomiting, colicky pains, head-ne, and sometimes delirium, stupor, and even death. laken for a ache, and sometimes delirium, stupor, and even death laken for a length of time, as in bread made with diseased rye, it acts as a poison, producing two conditions of the constitution, termed respectively, gangrenous ergotism and convulsive ergotism, both accompanied with formication' (Bentley & Trimen)

CLAY.	Ergot of Rye: Clay.		
1315	No effort appears to have been made to test medically the properties of the I — entirely from Furope A g — outsured repetry of barl — outs ard appearance, ceem of good quality but which contain a fungus, most probably an ergot it seems probable that Indian wheat rust may be due to a species of		
1316	Acidium reared on a Euphorbia Some writers have attributed to an ergot the poisonous qualities which kears (Luthyms Satirus) is said to possess. An indulgent use of this pea- induces a paralysis of the lower limbs which is generally incurable. See under Fingold Pests.		
	67 4771		

### CLAY.

1317 Clay is a hydrated silicate of alumina, which is expressed in mineralogy by the formula H₂ Si₂ O₈+H₂ O which may be said to be Si O₂ 40.40, Al₂ O 30.63, Water 13.92.

Properties and Classification —The pure clay, defined above, when it occurs, is generally known as "Kaolin" or "Porcelain clay". There are, however, numerous other inferior qualities, such as fire clay, pipe-clay, shale, clainch, loam, mud or silt, mudstone, &c. &c. Some of these would, however, be more correctly defined as soils containing more or less clay. Usually they are soft and plastic, and emit, when breathed on, the peculiar odour known as "argillaceous". They chiefly occur as superficial deposits in river-basins, estuaries, or dried up lakes. Pure clay is derived from a decomposition of felspar, from which the silicates of potash, soda, &c., have been washed out. The purer forms of clay are derived from grantie, the quartz and mica having been washed away as sand, and alumina silicate thrown down in the low-lying tracts of country.

to be the chief governing principles that determine the economic value or utility of a clay Iron may qualify a clay for one purpose but altogether disqualify it for another Any finely divided mineral substance, which contains from 10 to 30 per cent of alumina in the form of silicate, and which becomes plastic on being moistened and retains the form impirted to it by a mould even when dired or burned, is popularly termed "clay"

These facts naturally lead to an industrial classification of the clays, and in dealing with those met with in India we shall, as far as possible, take them up in the alphabetical order of their better known names in preference to attempting a scientific assortment

#### I.—BRICK CLAYS

In the early part of the present century, it was thought necessary to import bricks into India from England. It was soon discovered, however, that in almost every district clays suitable for this purpose existed r.

## Brick-Clay.

CLAY.

abundance, for bricks were employed in many buildings in India long anterior to the arrival of the Luglish Some of an enormous size are found in the ancient monuments, and in more recent times others much smaller than the European type

Ball says: "As a rule Indian-made bricks do not bear a very high reputation for strength or durability, but it has been demonstrated that good bricks can be made, and it seems probable that, in many cases where the bricks are bid, the system of manufacture, rather than the material, Of course there are som is to blame

kankar nodules that without grinding . for each englished In In machi.

> tice itom these impuated at Akra near Calturned out annually" in India see the Rurki

### MEDICINAL CLAYS AND FULLER'S II —EDIBLE AND

1310

Multani 1320

In most bazars in India a fine unctuous or only clay is sold as a drug or as an article of food eaten by encernte women, or used by Indies as a cosmetic. Allied to this is the clay used to effect caste markings on the forehead. Balfour says such a clay "is excavated from a pit near Koluth in large quantities, and exported as an article of commerce, giving a royalty of Rt,500 yearly. It is used chiefly to free the skin and hair from impurities; their complexions."

of the rivers is used a

clay before being wa

persons excavating a pale yellow mud from a hillock near the capital of Manipur, which he was informed was regularly eaten by the women throughout the State Irvine (Mat. Med of Patna, 66) says multani mittie-a kind of light yellow ochre-sasten nd (66) says multani

5 to 30 grs Sakharam Arjun (Bom

mulatání mattí "is caten by pregnar

stomach and is given mixed with sugar in cases o remorrhoea. further comments on an imported earth known as Sang-f-Basrs (a Persian name) "This is generally imported from Bassorah and the Persian Gulf, as its name implies It is used in tonic preparations and in irregular menses and with benefit from the iron it contains " He states that the earth in question is a silicate of alumina with lime and iron U O Dutt (Sans Mat. Med) after dealing with red and yellow ochre (which see ) or the geru matt in Beng, and garrika in Sans, adds "besides gairika several other varieties of earth are described and occas onally used in medicine A sweet-scented earth brought from Suc

ful for

product of Surat it is nowhere (so far as the writer can discover) de-

CLAY. Edib'e Clay. the course of a product may be inferred from its came. Under he account of Ranalp ods, Mr. Baden Powell says of mile gl hair wiThis is a soft and saponine deal-colouted earth, semetting like fuller's earth. a ld in small precess it is used for clearing the hair, also in ned dress is to le had in every hear, where it is called 'mill Meltin' or substituted that this Meltin'. Oaph, F. R. Pollock, on Deta Chizi Khan repeats, "it is stated that this Meltin' mills mills is imported to Deta Chizi Khan tempets, "it is stated that this Meltin' mills is imported to Deta Chizi Khan tempths interior of the western range (Swimmal) to the extent of tooos maunds." The Assistant Commissioner of Militan writes: "although it would appear Mulian is famous for its mitte or earth, set there are no mines or p to here which produce the substance. It is imported from the Múlt 1321 1322 1323 u hic give no information as to its source. as indicatil or quasiare most med earth ' Fuller's 570) gives ipposition r's earth. His account is of so much interest that we may reproduce here the main facts from it: "Being of detrital origin fuller's earth does not possess om having , employed In India sed in the , and doubtless for many other purposes. nature afford the principal part of those The practice of eating earth is widespread possible that the practice of eating them is not limited merely to pregnant women, as is sometimes stated." ' easily given up. tially baked clay i to be made by ... ives the following as the best known Indian sources of this earth : Sabun Miti. Bengal.—The saban mits or sorp-earth of Colgong in the Bhagalpur asion. The earth sold in Calcutta as Rajmahal mitts, a comestible 1324 earth, the precise source of which is not known.

- Aymir. itions that fuller's Over 2.000 camel-

Els Clar	CLAY.
Fire Clay.	
Bombay and Sind.—A pale greenish clay is found in Western Sind,	1327
n and Multan already alluded to; in the	1328
III.—FIRE CLAYS.	1329
These derive their name from their refractory nature—that is to say, from their capacity to resist very high temperatures without fusing, fissing, or altering their shape. The essential character of such clays is the state of the same	
, ,	1330
fire-brick clay of good quality is believed to exist. Baltour states; "Fire-	}
Beyone, 20 to 30 feet below the surface, is used for hre-bricks and for lining furnaces." Ball makes no mention of these South Indian sources of free-class, but he remarks that "it is probable that, with proper manipulation, some of the pottery class" "would afford perfectly refractory to the pottery class" "would afford perfectly refractory."	1
bricks and ctucing be equal to the assembles his prepara cone part of fuller '	
at a red heat. The crucibles so made, he says, are perfectly infusible and impermeable to melted metals or saline matters, and bear sudden heating	Ì
only goes as far as fire-clay obtained in the coal measures of the Raniganj District, and this we consider as good as the best English fire-clay. For your information we begt to quote some extracts from the official report of trials made at Her Mijesty's Mint, see pages 18, 19, and 20, part I, volume VIII of Records of the Geological Survey of India, 1875, which are as follow——————————————————————————————————	

CLAY.	Pipe Clay.
	"The specimens were subjected to a temperature of over 3,000° Int., the melting point of cast-iron being 2,780° Int., "Second experiment in January 1875 by H. B. Modlicott, Esq., M.A. F.G. S. "Sc. "Sc. "Sc. "Sc. "Sc. "Sc. "Sc.
	"In addition to the foregoing we beg to quote you the opinions of D. W. Campbell, Esc. 1 occ. 1 occ. 1 Railway, and U. Blackburn ntal Gas Com- pany. The fo 875, writes ic- "(2) I ha they are both very good; I exhausted." "And Mr. Blackburn, in his letter of 2nd March 1875, states as fol-
	lows:—  "(3) The Gas retorts made for the Company by your firm two years ago have since been kept in constant use at a temperature of about 2,000° Fht., and they have been found fully as durable and effective as those of the best English manufacture."
1332	tion r in cas herew Ramgalij Listict. IV.—PIPE CLAYS.
1352	This is known as Namam in Tamil and Kharra in Dukhni; its English name is taken from the fact of its being used to manufacture tobacco-pipes. It much resembles China clay, only that it possesses more silica Balfour says: "This is found in abundance in several parts of India, the Hindus employ it for making the distinguishing fren applied to parts of iere referred."
	mice construction of union searchs. Ball makes no mention of pipe-clays occur- ing in India. Blanford states that a thick bed of true pipe-clay exists between Terany and Kauray in Trichinopoli.
1333	V.—POTTERY CLAYS.
	These might be popularly referred to three sections or degrees of purity: (a) porcelain or kaolin clays, (b) ordinarly white or glazed pottery clays, and (b) red or tile and flower pot clays. In every province, indeed in almost every district of India, one or other of these clays occur. There is no the control of the clays occur is a control of the
1	One Luropean pottery, that of Messrs. Burn & Co, of Ranganj, in
ı	C 1022

### Pottery Clay

CLAY.

Bengal, is attempting to compete with European imported articles, Under the care of the School of Art, an effort is being made to utilise the white clays or kaolins of Madras, and Mr. George Terry of Bombay has

the line clays of Dustasuirt, Decoulsuite, and color and the Indian potter, whose only resource, with one of two numportant exceptions, is the brick earth of the plans and rivers. Fuel, which is of equal importance with potting minerals, is scare, and coal has never been used by the native artitions. In Bengal, coal is used by the native brick-maker

workers in earth, viz., Kumhars and Lashigars The former are the common village potters who " produce wares which, though of little technical value as pottery and of small commercial importance, are often good in colour and form, and perfectly fitted for the purposes they are intended to serve " The latter, the Kashigars, are "makers of glazed earthenware who are only to be found in the Panjab and in Sind, and within the last few years in the town of Bombay and at Khurja in the North-Western Provinces The name of the trade is Persian, derived probably from Kashan, the earliest seat of the manufacture, and the Kashigar is usually a Mussulman of good caste In India the art has been, until recently, almost entirely architectural in its character and devoted to the covering of the wall surfaces of mosques and tombs with enamelled plaques and tiles Persia may originally have borrowed the fashion from Fartar or Chinese sources, but there seems little doubt, notwithstanding some vague traditions as to its importation direct from China, that it was introduced into India by the Mussulman invasion, and not by means of the friendly intercourse which there seems reason to believe subsisted at various times with Tibet and the further East " Sir George Birdwood (Indian Arts) has recorded a high testimony as to the ment of the artistic forms of the common red pottery-forms which are seen portrayed on some of the earliest monuments of India He has also spoken, with the highest admiration, of the elegant adaptations of the decorative designs with the forms and uses of the vessels which are turned out by the workers in glazed pottery. It is not within the scope of the present work to enter upon these Sufficient has been said to convey a general impression of the magnitude and character of the Indian ceramic art, and we may therefore conclude the present article with a brief abstract of the published facts regarding the clays met with in the provinces of India which are suitable for pottery, omitting all reference to the third class of clays, vis, the

300	Dictionary of the Economic
CLAY.	Pottery Clay.
	par and kaolin are obtainable in different parts of the district." "In the South Arcot district a fine plastic clay occurs in the Cuddalore beds need the south bank of the Guddalum," but it contains small quantities of lim and iron, the latter giving it a pinkish tint. In North Arcot the grant rocks of the district are decomposed to a certain evient, and, according it Mr. Foote, would yield a certain but not very considerable supply of kaolin. White goblets are made in Arcot which empoysome reputation, but he source of the clay is not known. Fine politry clays exist in great abundance in the district of Chingleput, more especially at Sirpermatur From the beds exposed at Coopum a supply has been taken for the Madras School of Art.
1335	and, Mysore—For many years it has been known that kaolin earth existed in great abundance in this State, the beds extending from Bangalore to Nandydrug. When mixed with quartz these clays have been found to afford a valuable fire clay. Specimens of a white clay sent from Mysore were favourably reported on by Minton.
1336	3rd, Mangalore.—As early as 1841 Dr. Christie discovered, in associa- tion with the laterite, an extensive deposit of what he conceived to be pure porcelain clay.
1337	4th, Bengal —In Orissa white clays occur in the Mahanadi valley of Rajmahal age. These clays are used by the natives for ornamenting their houses and in tanning leather. The Colgong clay has already been alluded to, it is of the same age as that used at Patharghata in the manufacture of pipes. In several parts of the Raymahal hills there are beds of white silicious clays belonging to the Barahar coil measures which are suitable for the manufacture of many articles of hard pottery, and which, with proper trealment, would afford suitable material for fire-brieks. But the best known clays of this series are the refractory and other clays now being worked by Messrs Burn and Oo of Rainganj. The clay used at the pottery works is chiefly obtained from the coal-beds and consists of more or less decomposed shale, but a white lithomarge is obtained under laterite at a point about 12 miles north-east of Binkura. A certain amount of kaolin, Mr. Ball states, might be obtained from the area.
1338	5th, NW. Provinces.—In the year 1838, a Mr. D. Jeffreys established pottery works at Farehgarh and produced articles with a very considerable degree of success. Black pottery is made at Azimgarh, which owes its colour to the occuring matter present in the clay.
1339	6th, Panjab.—According to Mr. Baden Powell two classes of class occur in this province—a grey clay which burns red, and clays which burn to a yellowish white or cream colour. Reference has alredy been made to some of these, but for pottery purposes the clays of Dera Ghatz Khan, Dera Ismail Khan, and Kohat deserve special mention. There are kaolin mines at Kassumpur in the Delhu District, and also on the hills near the Kutub Minar. By washing, the quartz and mica are removed from these, and the Laolin presied into the cakes which are sold for white-washing purposes, and may possibly also be used in pottery. Good kaolin is also reported to be found at Buchara near the Lota river in the Alwar hill.
1340	th, Assan and Burma—Rich deposits of porcelain clays have been reported to occur or Upper Assam near the Bhramakhund, known locally as yukmaniytha, and a fine clay for pottery purposes is also said to be found near the base of the extancous rocks at the wettern end of the Garo hills. In Burma the ordinary alluvial clay, mixed with sand, affords the material for common pottery, but a dark-coloured seam in the Irawadi salley is much sought after by the potters. Some of the upper beds in the numerial tie group are said to consist of China clay and would answer

### Glazing and Colouring Pottery.

CLAY.

1341

well for pottery, owing to their freedom from iron. Kaolin is also reported to exist in Tenasserim. Of the clays experimented with by Sir William O'Shaughnessy that from Singapore was said to be the best.

# VI .- MATERIALS USED FOR GLAZING OR PAINTING POTTERY IN INDIA.

The indigenous art of glazing pottery, as practised in India is crude and unsatisfactory. Ball stays: "The varnish or imperfect glaze used for the sugar-bollers' pans, known in Bengal as belaz, is thus described by Mrc Piddington: There are two kinds of earth used, one of which is called belutif; it is a silicious and ochreous earth, the best being found to or 18 miles from Kulna. By levigation it is prepared for use, the process lasting, it is said 15 days. The other earth is called Viperomi, and is a tenacious loam. The best was obtained at Monad, 20 miles weet of Chinsurah, and at Panchehou ki, 16 miles south-west of Kulna. Its preparation is said to take three months, and only to seers are obtained from one maund of the earth; two varieties of the sporomi are gad and majors. Successive layers of mixtures of gad, belutif, and spo-

I342

times an organic varnish is used for this purpose, except when, as mentioned in connection with Azimgarh, the clay itself contains the necessary organic matter to cause it to burn black. Artificially blackened pottery is produced at Monghir, Patna, Sarun, Chunar, and Surat. In the younger rocks of the Rajmahal series certain clays occur called According to Buchanan the pot-These are used as pigments ters of Raymahal use this khars for gring a white surface to pottery made of ordinary clays. Cheap potters is often painted after having been baked, such as that seen at Kota, Lucknow, Benares, &c.; at other times it is powdered with mica, or by other mechanical means has a colour im-parted to it. Black pottery is, for example, often eiched, and a preparation of tin and mercury rubbed into the patterns in imitation of metal bidri-ware. With the exception of these miserable attempts the kumhar potter is innocent of the art of clazing his wares. A much more advanced knowledge is possessed by the Kashigar, indeed, the possession of this knowledge is the recognised character stic of his trade "The shades of blue which constitute the chief feature of the Sind and Panjab pottery are produced by oxide of cobalt. The supply of this substance is limited to certain mines in Rajputan " (see Cobalt). Glazed pottery is made in Sind, chieft at Hala, Hyderabad, Tattu, and Jerruck, and in the Panjáb at Lahore, Multan, Jhang, Delhi, &c The chief places for the manufacture of encaustic tiles are at Bulti and Saidpur in Sind. Sir George Birdwood (p. 307) says, in the glazing and colouring, two preparations are of essential importance, namely, kinch, literally glass, and sikka, oxides of lead Panjab the two kinds of kanch used are distinguished as angrezi kanchi, "English glare" and den tanchi, "country glare" "The former is sa d to be made of "singer-sifed, a white quartione rock, sg parts; saggi or pure soda 6 parts; sohaça teles er pure borax, a parts; and nausadar, or sal ammoniac, 1 part Each ingrediert is finely powdered and sifted, mixed with a little water, and made into white balls of the size of an orange. There are red-heated, and after evoling again, ground down and afted. Then the material is put irto a furnace until it melts, when clean-picked shore

1343

368

**LEIDION** Glazing and Colouring Pottery. iavanıcum. lalms or sultpetre is stirred in A foam appears in the surface, which is skimmed off and set aside for use" The latter is similarly made of quartzose rock and borax or sinceous sand and soda "A point is made 1344 of firing the furnace in which the kanch is melted with kikar" (Acacia arabica), "karir" (A Catechu), or "Capparis wood" ' Four sikka, or oxides of lead, are known, namely, sikko sofed, white oxide, the basis of the blues, greens, and greys used, sikka sord, the basis of the yellows, silka sharbati, litharge, and silka lal, red oxide" "Silka sifed is made by reducing the lead with half its weight of tin, sikka sard by reducing the lead with a quarter of its weight of tin, sikka sharbate by reducing with zinc instead of tin, sikka lal in the same way, oxidising the lead until red" "All the blues are prepared by mixing either copper or manganese, or cobalt, in various proportions with the above white glaze The glaze and colouring matter are ground together to an impalpable powder ready for application to the vessel" "The rita or saffre is the black oxide of cobalt found all over Central and Southern India which has been roasted and powdered, mixed with a little powdered flint." Sir George further describes another process of preparing the mla or indigo blue glaze for use by itself, which consists in taking powdered flint 4 parts borax 24, red oxide of lead 12, white quartzose rock 7, soda 5, zinc 5 and paffre s, burning the mixture in the kinch furnace as before "The yellow glaze used as the basis of the greens is made of sikka 1345 sard, white oxide I seer, and sing safed, a white quartzose rock or millstone, or burnt and pondered flint, 4 chittaks, to which, when fused, 1 chittak of borax is added " "The green I ars produced are (1) Zamrudi, deep green (1 seer of 1346 ' 'imba or calcined copper), (2) Sabz, full plaze and 3 c " pale green" by smaller green (3) proportions of the Luci /burning i seer of copper filings with nimak suor, o ır George Bırd-ifter having dereduced to powder, are painted on with gum or gluten The vessel to receive them is first carefully smoothed over and cleaned and, as the pot tery clay is red when burnt it is next painted all over with a soapy, whitish engobe, prepared with white clay and borax and Acacia or Anogeissus gums called kharya mutts The powdered colours are ground up with a mixture of nishasta, or gluten and water called mawa, until the proper consistence is obtained when they are pointed on with a brush. The vessels are then carefully dried and baked in a furnace heated with ber (Zizyphus), or, in some cases, Capparis wood " VII.-CLAYS OR EARTHS EMPLOYED AS PIGMENTS 1347 OR DYES See "Pigments" for further information as to colouring of pottery Clearing Nut, see Strychnos potatorum, Linn , LOGANIACEE CLEIDION, Blume, Gen P1, III, 320 Cleidion javanicum, Bi Ft Br Ind., V., 444, Luenordiacre 1348 Syn - ROTTLERA URANDA Dale & Gibs , Bomb Fl , 230 Vern -Otherngass othern Sing Resetences - h re For Ft, Burm, 11, 390, Beldome, Ft Sylv, t celexit, Gamble Man Timb, 349, Thmailes, En Ceylon Pt, 112, Lisbod, U Pt Bomb, 123

The Clematis.	CLEMATIS grata
Madras it is used for building purposes	In IMBER
[EUTHORBIACE CLEISTANTHUS, Hook f, Gen Pl, 111, 268,	E.JE
Cleistanthus malabaricus, Mull -Arg, Il Br Int, V, 276	1350
References — Gamble, Man Timb, 357 Lisbon U Pl Bomb, 120 Habitat — A small tree found in the Konkan and Malabar districts South India	
Structure of the Wood —Lisboa mentions this plant amongst his u ful timbers	I351
C. myrianthus, Kurz, For Fi Burm, II, 370, Fi Br. Ind, V, 2 Vern - Mo-man tha Burn Reference - Gamble, Man Timb, 357	75 1352
Habitat —A moderate-sized evergreen tree of the tropical forests Burma and the Andaman Islands Structure of the Wood —Moderately hard, reddish grey Wei 41b per cubic foot	
CLEMATIS, Linn, Gen Pt, I, 3	-333
Clematis barbellata, Edgen, J. B. Jind, J., 3, RIVINCULIC Reference—Gamble, Man Timb, I Habitat—A woody climber of the western temperate Himals Garhavil, and Kumaon	1
C. Buchananiana, DC, Fl Br Ind, I, 6  References -Kurr For Fl Burm, I, 17, Gamble, Man Timb, Royle, Ill Him. Bd. I, 5;  Habitat.—A large woody climber, occurs throughout the temper	1355
Himalaya at 6,000 feet  C. GOURIANA, Roxb., Fl. Br. Ind., I., 4, Wight, Ic. 1 933-4  References—Roxb. Fl. Ind. Fd. C.B.C. 457 Aurz., For Fl. Burrn. 16, Gamble, Man. Timb. I., Thuaite & Coylon Fl. 1 Dals & C.  O. Chaughters, Hawan. E. P. 12, West, Hort. Sub. Cat.,  Balfour, Cyclop  Habitat—An extensive climber found in the hilly districts from Western Himalaya, rising up to 3 000 feet, to Ceylon and the West  Peninsula.	the ern
Medicine —This plant and some of the other species abound in an an poisonous principle. The LEAVES and fresh STESIS, if bruised and app to the skin, cause vestation. In France the C vitaba, Linn, is used mendicants to cause artificial sores for the furtherance of their impostu	lied Leaves
C grata, Wall, Il Br Ind, I, 3	1359
Vern —Ghantuli, biliri Hino References —Gamble, Man Timb, I, longt, Hort Sub Cal, 2, Ri Ill Him Bol, 1, 44, 45, 51, Balfour, Cyclop	
z B C. 133	59 '

CLEOME viscosa	Wild Mustard
***************************************	Habitat.—A climber of the sub-tropical and temperate Himálaya at 2,000 to 3,000 feet.
1360	Clematis montana, IIam. , Fl. Br. Ind , I , 2. Vern —Ghantidi, Ilino
	References.—Gamble, Man Timb, I., Royle, Ill Him Bot, I., 45, 51  Habitat.—A woody climber of the temperate Himfinga, from the Indus to the Brimputta, ascending to 12,000 feet, always above 8,500 l  Sikkim, and in the Khrisri Hills, Manipur, above 4,000 feet.
1361	C. napaulensis, DC; Fl. Br. Ind, I., 2.
	Vern.—Pawanne, birri, wandat, Pa References.—Stewart, Pb Pl , 3; Royle, Ill Him Bot , 23
MEDICINE.	Habitat.—Found in the temperate Himáliya from Garhnál to Bhutar Medicine.—In Kanawar the LEAVES are said to act deleteriously of the skin.
1362 1363	C. triloba, Hone; Fl Br Ind, I, 3
	Vern -Moratela, mortel, morsel, ranjet, ránjas, Bons, Moratelo
	References Dals & Gibs Bomb Fl, I, Dymock, Mat Med W Ind and Fd, 21; S Aejun, Bomb Drugs, 2
	Habitat An extensive climber met with in the mountains of the
MEDICINE Fiant 1364	
FIBRE.	(
I365 Distillate, I366	of hill districts Bracounot has pointed out that the acrid active principle may be distriled with water and is soluble in fixed oils
	CLEOME, Linn ; Gen Pl , I , 105, 968.
,	Cleome pentaphylla, see Gynandropsis pentaphylla, DC; CAPPARIDF &
1367	C. viscosa, Linn; Fl Br Ind, I, 170, Wight, Ic, 1.2
	Sometimes called Wild Mustard  Syn — C Icosandra, Linn, Polanisia viscosa, DC; P Icosandra,
	Wen - Kanphuis, hurhúr (or h
	Har-haria, Beng , Hal ha
	niero scana-burbára,
	Reletences — Roxb Fi Ind , Ed CBC, 501, U C Dutt, Mat Med Hind 280 Dynack Mat Med W Ind , 2nd El , 61 Annibe Mat Ind , 11, 223 O Shaughnery, Beng Dipert, 301, 14, 18, 120 Drug; Sind, 32 Drug, U Pl 351 Baden Posell, Ph Fored, 330, Cocke, Olla and Olivectis, 37 Alkinson, Him Dut, 321, Brdwood,
	C. 1367

#### or Burhur.

CLEOME viscosa.

Bomb. Pr., 276; Lisboa, U. Pl. Bomb., 148; Spons' Encylop., 1415; Balfour, Cyclop.

Habitat.—A common weed throughout the greater part of India, appearing in the rainy season; very common in Bengal and South India.

Oil.—The seeds yield a light obve-green-coloured limpid oil when subject to a great pressure. It seems likely that this oil would prove serviceable where a very liquid oil is required. The oil could be prepared to any extent.

Medicine—The surge of the leaves is poured into the ear to relieve earnche. According to Rheede, it susclul in dealness. Dr. Dymock writes
that the junce mixed with oil is a popular remedy in Bombay for purulent discharges from the ear, whence the Bombay name of the plant

01**L**.

1368

MEDICINE. Juleo 1360

Leaves.

1370

Seeds. I37I

tea-spoonful diarrhea. | ueezed into | ri. Elavah). | chutney to

the small, compressed, netted-surfaced, nottish-tasted SPEDs of tins

promote digestion" (Surgeon-Major John North, Bargalore). "Used to relieve car-ache and as an astringent in cases of atorrhoa; the ear should be syringed well before its application" (Brigade Surgeon J. H. Thornton, Monghy). "Alterative, useful in secondary sphilis and enlargement of the her and spleen" (Surgeon-Major J. McD. Houston, Travancore; and John Gomes, Esq. Medical Storkeeper, Trevandrum) "The seed made into chutney has strong digestive power "(Native Doptor Umnegudien, Metapollium, Madras).

"The seeds of Cleome viscosa are anthelmintic, rubefacient, and vesicant; and diseases of

also as a r is used. I and, in addition to this, the juice possesses a curative influence over

some cases of otalgra and otorrhoes, but the smarting it produces in The the

water. The leaves are also applied to the skin in the form of a poultice or paste by brussing with vinegar, lime-juice, or hot water, and their juice er. The

for two

ntic and car-

other purgative. For children the dose is from five to twenty grains, according to their age. As a drug the leaves of Gleome viscosa are much superior to those of Gynandropsis pentaphylla. It is the former which possess a distinct feetid smell and efficient rubefacient and esiscant properties, and not the latter. The above plants are frequently found growing together and are often confused partly from a general botanical similarity between them, and partly on account of their native synonyms being almost the same. The close similarity of their seeds adds greatly to this confusion. There will be, however, no difficulty in

#### CLERODENDRON inerme.

### A Mild Antiperiodic.

#### MEDICINE.

distinguishing the two plants if due attention is paid to the following botamical characters:-

"Cleame viscos: -Siliqua flat, striated, pubescent, and sessile or short stalked; flowers yellow, stem and branches quite covered with viscid

strongly.

"As the seeds of both of these plants are very similar, I need not describe them separately They are as follows: small, flat, and slightly acrid or bitterish intaste. They yield a small quantity of fixed oil on expression

"As a rubefreient and vesicant, the seeds under examination are much superior to the mustard seed in this country, and quite equal to the mustard imported from Furope. If they can be reduced to as fine a powder as Europe mustard, I think they will be found to excel the latter also in remedial value" (Honorary Surgeon Moodeen Sheriff, Khan Bahadur, Triplicane, Madras)
Food.—" The Spens of Cleome viscosa are much used by the natives,

chiefly the Brahmins, in their curries; they are sold in all the bazars at a trilling price" (Roxb) Lisboa says that the PLANT is caten boiled

Sık

with chillies and salt as salad

# CLERODENDRON, Linn; Gen Pl, II, 1155

This name alludes to the variable properties of the species kleros, lot, and dendron, a tree [VERBENACEÆ

Clerodendron Colebrookianum, Walp., Fl Br. Ind., IV, 594; Vern - Kadungbi, LEPCHA

Reference - Gamble, Man Timb, 299 Habitat. -An evergreen shrub, with silvery-grey bark, met with in also in Burma

enchas

FOOD. I375 TIMBER 1376 1377

PERFUMERY.

1378

MEDICINE Plant.

1379

FOOD.

Plant. 1373

1374

Seeds 1372

> C. merme, Gartn , Fl Br Ind , IV , 586 Syn - Volkameria inermis, Linn

Habitat -A large, ramous often scandent evergreen shrub, common in tidal forests in Bengal, Burma, and the Andamans

Perfamery .- An exquisite perfame is said to be derived from the

flowers of this plant (Presse)

Medicine - Dr Dymock says that the PLANT has a reputation as a febrifuge in remittent and intermittent fevers. This fact is supported by Dr. Sakharam Arjun, who, upon the authority of Dr. Hojel, states that

#### A Substitute for Chiretta.

CLERODENDRON infortunatum

ld a larna i

[ Wight, Ic., t 1471 Clerodendron infortunatum, Garin; Fl Br Ind., IV., 594,

1380

Syn -- Volkameria infortunata, Roxò, Fl Ind, Ed CBC, 478, G

Vern —Bhant, bhat, Hind, Bhant, ghents, Beng, kharbars, barnt or warnt Santal, kulamarsal, kol., Chilu, Negal, kdung, Lerchs, Lukunah, Mecut Kait bassit, Pa, Kart, Bohn, Bhandira, kart, Mar, Bockada, Tel., Perage Mala, Bhahdra, bhanti bhantaka, Sans, Ka aunggsh, buyahyi, khaoung gyi, luwu, Mcas pinna Sina

References — Brandis, For Fl, 363 Kurs, For Fl Burm, II, 267 Bedd, For Man, 173 Gamble, Man Timb, 299 Thwaites, En Ceylon Pl, 243, Dala & Gibs Bomb Fl, 200 Slewart, Pb Pl, 165 Voigt,

Hab tat.—A pinkish white-flowered shrub, common in wrste places throughout the greater part of India and Burma, and in the damp forests of Ceylon up to an elevation of 5,000 feet Grows gregariously, forming a dense under vegetation, specially associated with the Bumboo On passing into fruit the callyx becomes scarlet, and the plant is then even more attractive than when covered with its feutily, scented flower.

Medicine — "Dr Bholanath Bose calls attention to the Leives of that plant as a cheap and efficient substitute for chriefta as a tonic and uniperiodic." (Pharm Lnd) According to Dr Kanny Lal Do, OTE, the fresh 2010 of the leaves is employed by the natives as a vermidage, and also as a bitter tonic and febringe in malanous fevers, especially in those of children Dr Dymock states that he has not seen the leaves used medicantly in Bombay, but they are bitter Dr Hong Berger mentions the use of the bark in medicine by the Arabian and the Indian physicians

Special Opmons—§' The expressed jurie is an excellent lavaire, chololy, ogue and anthelimine: It is used as an injection into the rectum in cases of ascardes. It is also a valuable butter tonic, and the matter believe that its presence cures scales in the locality," (Brigade Surgeon J. II Thornton B. A., M. B., Monghir)—"It is and to be a very useful intiperodic, (Surgeon Major E. Sandares Chittagong)—"The juge of the fresh levies is used as a febrilize for infants and children." (P. 17 R. Ducca)—"The juge of leaves found to be an efficient antheliminate." (Surgeon G. J. W. Meadors Burrisal)—"The decoction of the leaves is a powerful antiperodic, and is a valuable adjunct to arsenic in the treatment of milanous fevers" (Civil Medical Officer U. C. Dutt, Serampore). "Decoction of the leaves is used."

Decoction.

MEDICINE.

Leaves.

1381

Juice

1382

Bark

1383

febrifuge " (Surgeon-

A 130 L. C. Density, National Domestic Uses—Edgeworth mentions that this plant is used in the Ambala district to give fire by friction

DOMESTIC.

3/4	Dictionary of the Feonomic	
CLERODE		-
1386	Clerodendron phlomoides, Linn., Fi. Br. Irt. IV., 590, Wie	;
	Vern—".  G(1)  S(1)  S(2)	
	References - R. v. F. Int. F. C. C. C. v.y. Prantic F. F. y. Gandle Man Timb. 25; Thrustee Fn Costan It. 24. Data C. I L. J. Data C. I L. J. J. Society Man S. A. Alville, Mar. Ind. S. A. A. Alville, Mar. Ind. J. A. J. J. J. J. Society, J.	ş
	Habitat — A tall pubescent shrub, common in many parts of Ind principally in the dri Behar, Bengal, Oud	
MEDICINE ROOL 1387	Medicine.—Dr. India su pose the nor of the plant has alterative properties, but he has nes seen it used as such valescence of mersles.	er n
	tise It prescribed by them in	7 F
	The Rev. A Oampboll says the Santals give this plant to their crit to cure them of darrhees and worms, or when the stomach swells. M Oampboll also says the Santals rub the plant over their bodies in dropsy	r
1388	C. serratum, Spring, Fl Br Int. IV., 592, Wight, Ic, t 1472	
	Vern — Boranti, gant-kohurangi (1901), Ilivo , Saram lutur, Sevial Chia, Nepal, Ji, Lercita, Bharangi, Guj, Bharang, bharang itu, culham addakti https://doi.org/10.1006/ Chru tekka, ndpalu La Babbara (1901)	,
	References — Brandis For Fl, 3/4, Lure, For Fl Eurm, 11, 27, Gamble, Man Tumb 299, Date & Gibs, Bomb Fl 200, Astehnon, Cat Pb Pl, 121 Voict, Hort Sub Cal, 4/5, Pharm Ind, 164, 164, 164, 164, 164, 164, 164, 164	•
	144, Atkinson, siim Di ,	
	or City-1 -to-	
MEDICINE Root 1389		
	It occurs in the forr ness varying from quently swollen int any odour or taste	
Leaves 1390	(Pharm Ind) D	
Seeds 1391	butter-milk	

,	
A Charm against Disease.	CLITORIA Ternatea.
Special Opinions.— "Slightly aperient" (Surgeon H. W. Hill, Man- phoom). "Used in infusion (3 to xx) in bronchial affections, and as a "liked medictually "inhhoom." (Lithon). The flowers are also caten as greens (Balfour). The ROOT is used by the Santals to cause the fermentation of rice-beet (Rev. A. Campbell).  [Wight, Ill., 1.773.  Clerodendron Siphonanthus, R. Br.; Fl. Br. Ind., IV., 595.;  Spin.—Siphonanthus indica, Linn., Rath., Fl. Ind., Ed. C.B. C., 481.  Vern.—Berangt, bharangt, Hilling. Baminhalti, behamma, hatt, Beao; Arnl., das-ti-mubarik, arnah, Ps.; Bharangt, Dan- hatt, Beao; Arnl., das-ti-mubarik, arnah, Ps.; Bharangt, Bons.	Food. Leaves. 1392 Root. 1393 1394
; Thmailes, 'eywart, Ph' Cal-, 465, W. Ind., Bol., 209; 'any.	
Bengals and used as a charm against various ailments (Gamble). The Roor is considered useful in asthma, cough, and scrotalous affections.	I 1305 MEDICINE, Wood, 1396 Root, 1397 Confection, 1398
myrobolan, treacle, and the usual aromatic substances. It is used in asthma. An ott, prepared with a decoction and paste of the root in the usual proportions, is recommended for external application in the marasmus of children " (U C Dutt, Hat. Med. Hind, 21p). Mr. Baden Powell writes that the PLANT is slightly bitter and astringent, and that the results is employed in sobulities their marks m.	0!!. 1300 Plant. 1400
the resun is employed in symbility rheumatism.  Special Option—4 "The expressed juting of the leaves and tender branches is used with ghi as an application in herpetic eroptions and peringgis. The BRANCHES, are put on the necks of cl and it is believed by the cure these diseases" (B. Monghir).	Juice. 1401 Beads. 1402
CLITORIA, Linn.; Gen. Pl., I., 528.	{
Clitoria Ternatea, Lunn.; Fl. Br. Ind., II, 208; Bot. Mag., 1. 1543;	1403
С. 1403	

### CLITORIA Ternatea.

#### A Powerful Cathanie.

	Fant : Dintens, fills, milts, fills finding, m faulintens, in la phin fant knowldingled me night neine, Tke, a Songa puchnim, beblinens
	a fin fild of at filter at the filter of the control of the contro
	furginess, et 1 mg -duess, estimated a sesin Hirdwood), Met in buile
	mudanter ton, bregunna, gebreng min', Kan ; breren dedert, at-
	photomare sta, got erms mat nitretiele buent, nitretiers, bieres, atteres, and a discourant and the contract of the contract o
	fo rete, ARIN ift realliedille aurer, entine Aitheb eyerfmeit, Pent .
	I strue for a ung me, wang men shad. He use a Katharata melantis
	erio, nifetatise (m. rive)
	References Fast . Fl. Int . Et C.H. C. see Theatles. En, Cepten Fl.
	By Date Co Gar . P at. M. et a Strovet, I's Places Arching, Cal.
	It. Pl. 212 Veiel, Heet Sat, Cat, 111) Phirm. Ind. Asy Monteen
	Shere, Supp. I Sarm. Int. 1 st. 186 ; C. Dutt, Mar. Met. Int. 145.
	first O'Shanghnesty, lien
	l Esh. P. 111 ; S. Jejun
	Pone l. It Fr , up   Bu
	Ray Bullour, Corl 9.2 T Painn, 75, Med Top., Ajr
	Dept. Cer., Nec. 150; Majord's Burma, p. 412.
	Habitat
	over India. ! sland of
	Ternate, one
	name of the plant.
	DreBidie remarks that the segns are said to be used by dyers.
DYE. Seeds.	"The corollas of the blue sarrety are said to afford a blue dye in Cochin
1404	China, but it is not permanent; and Rumphius says that they are used for
*404	colouring boiled rice in Amboyna" (Treasury of Botany).
MEDICINE	Medicine. The ROOT is a powerful catharne like rilap, and has been
Root	recommended to be used along with other laxatives and diuretics in ascites
1405	Ainslie recom-
	Bengal Dispensa-
	r to test its alleged
	nce An alcoholic
	extract acts, however, as a brisk purgative in from 5 to 10 grain doses. But
	. ;; .,,
	as a diuretic, and in some cases as a laxative. The spring are, however,
Seeds. 1400	more useful, and have gained a certain reputation in Europe as a safe
1400	med sine ecoccially for children
Leaves	
	in preventing the name Kalt-

1407

in preventing the name Kalt-

tituted. r account be cool-

mintic, and used for weakness of sight, sore-throat, and mucous disorders; also in tumours and the affections of the skin, and in dropsy."

Juice 1408 "The juice of the leaves, mixed with that of green ginger, is administered in cases of colliquative sweating in hectic lever" (Taylor, Med. Top. Dacca, 52, 53).

Special Opinions. - § "There are two varieties of Clitoria Ternatea distinguished by the colour of their flowers, as blue and white, and the blue

#### Clitoria Seedo-a Medicine used in Cronn. &c.

CT OVES

again has a sub-variety, in which the flowers are double. There is no distinct difference between the action of the seeds of these varieties, or if any at all, it is in favour of the white one. The plants are in flower all the year. The seeds are not generally sold in the bazar, but when they are, they are almost always of very inferior quality, in consequence of their being collected before their maturity. They should not be removed until

e edges. ninutely though The The im-

mature seeds are flat and dark brown in colour, the matured thick and round seeds are an efficient purgative, and produce five or six motions in one drachm or one drachm and a half doses Their action is increased in proportion to the increase of their quantity up to two drachms, when the number of motions is generally eight or nine. The seeds are one of those drugs which act very satisfactorily when used alone, but they may also be administered in combination with cream of tartar, in equal proportion, and with a few grains of ginger in each drachm of the compound powder. The dose of the compound powder is from a drachm and a half to two drachms The fresh root, or rather root-bark, of Chitoria Ternatea is a

the symptoms of gonorrhoa and irritation of the bladder, as strangury, scalding of unine and frequency of micturition, and in some cases the gonorrhoeal discharge itself is much abated under its use. One small root is generally a dose for children under two years, and one large root or two small ones for those between three and six years the dose is four or six roots if small, and three to five if large" (Honorary Surgeon Moodeen Sheriff, Triplicane). "There are two varieties of this plant one has white and another bluish-coloured flowers, for medicinal purposes the latter variety is preferable. Juice of the leaves mixed with

und the ear in ear aches, especially he neighbouring glands' (Surgeon

"Seeds purgative, root demulcent, dose, seeds powdered, 30 to 60 grains, root, one to two drachins of dry bark in powder" (Apothecary Thomas Ward, Madanapalle, Cuddap th) weed as a drivine purpositive and distretion in drops, also in cases of ejstitis. The roots of the blue species are used as an inside in cases of snike. (Bragade Surgeon J. II Thornton, B.A., M.B., Mongher). "The seeds are used as a mild purgositive for children" (Surgeon-Major J. bit flowers and the

thite flowers and the st" (Native Doctor a drastic purgative reon Shib Chunder

· on dered root of this drepsy" (Surgeon Major John North, Bings' res

Sacred Uses -The flower is held socred to the goddess Durga,

Clover, see Trifo'imm pratense, I im , Leut MINOSE. Cloves, 'ce Carpophyllus arematicus, I 177 , MYRTACEE. . SACRED I4II

C. 1411

MEDICINE.

1400

1410

	Dictionary of the Economic					
COAL.	Coal.					
	CNICUS, Linn.; Gen. Pl., II., 468.					
1412	Cnicus arvensis, Hoffm.; Fl. Br. Ind., III., 362; Courosite.					
	SJU.—CARDUS LANATUS, Rosts, FI. Ind., Fd. CBC, 595. Vern.—Ehur-Ohur, NWP. Reference.—Smith, Dictionary, 410					
OIL. Seeds 1413	Habitat —Found throughout India, especially incultivated fields in the Gangette plains, the common thistic of India Oi.—Produces small black strains, which yield a large quantity of oil. The steds are gathered by the poorer classes, and the oil expressed by them for their own use. It burns with smoke, is otherwise of good quality.					
	Cnidium diffusum, see Sessh indicum, W. & A.; Undethifere.					
1414	Coal.					
-4-4	CHARBON DE TERRE, Fr.; STEINKOHLEN, Germ.; CARBONI FOS- SILI, IL.; CARNNES DE PEDRA, POPL., CARBONES DE PIEDRA, SP					
	Vern,—Köyelah or Auela, Ulup ; Köyall, Ileno , Kölid, Duk , Kari or Simal karri, Tan , Bugu or Sima bogu, Irl , Kari, Mul , Idlallin, Kan , kodlo, kilin, Guj ; Anguru, Cing , Fahm, Arab ; Zughal, Pers , Angdrahd Sins ; Uliu e, midu-ye, Burm					
	References.—So much has been writen regarding Indian Coal that an enumeration of the publications would occupy many pages. The reader is referred to Bill's Economic Geology, pp 509-604, to the Hensier, Records of the Geological Survey, and to the Tournals of the Anthe Society of Bengal. The following works may, however, be specially men-					
	tioned:- Final Report of the Coal Committee: Dr. T. Ol thum's Report on the					
į	Annual Adminis					
	REGIONS OF INDIAN COAL					
	The following account of the coat-fields of India has been furnished by Mr. H B. Medicott for this publication:					
1415	ABSTRACT OF THE PENTURES OF INDIAN COAL.					
	"Ind a possesse extensive stores of coal, though none of it belongs to be so-styled carbonicerous period, and in India stuff the coal-measure rocks are rot all of one formation. All the coal of peninsular India occurs in the rocks known as the Gordwans system, the fossil flora of which has a resize, basely and all the coal of estaperimistic India occurs in rocks of creaceus or test ary age. In both cases the distribution is join at IT of Gordwans coal-measures have only been found in the central and north-reastent provinces, i.e., in writeria liengal, the Central Provinces, and the Number 1 terms responsy stating the outh border of the North-Western Provinces, as the remains in the extreme north-reast of the Madian president. The test ary coal has been trace all along the outer right of the Indiangers, plant from Sind to Pepul, but it is only in Anism and Upper Burenata valuable menutes have been found where a coal coars in warkable quant to.					

### Coal fields of India.

### (H. B. Medlicott).

COAL.

SOUTH INDIA

1416

"In both regions the quality of the coal varies much, as in all coalmeasures; but the best in both, reaches a very high standard, almost if not quite, up to that of high class English coals. In the Gondwana (Bengal) some an excess of

ash is low. a lighter

	BENGAL		Assan	
	Average of 31	Best	Average of 23	Best
ixed carbon olatile exclusive of moisture costure sh	53 20 25 93 4 80 16 17	66 52 28 12 96 4 40	56 5 34 6 5 0 3 9	66 I 33 5 '4
	100*	100	100*	100

" In Bannal out largel other

munication. " In the Cent-

and the Warora work, and the

opened up

"In the Singareni and Sasti fields of the Nizam's Territories some arried out pending the establishment of

has recently been started in the Makum

# MORP DETAILED STATEMENT OF THE COAL-YIELDING DISTRICTS

"The mineral is more particularly developed in the central eastern portion of the Peninsula

In the Madras Presidency it is found at-

"Beddadanol -Lat 17°14', Long 81°17 30" The field, about 38 miles from Rajahmundry, is about 51 square miles in extent, and contains four seams of very poor coal, worthless as fuel This is the most southern

> 36', Long 81°7' Has its the River Godavari; on ons of coal, of which only

Lingalla -Lat 18°, Long 80°54' Two seams, neither of which exi, and another.

but still in the

ivitain's Dominions, is that near Singarem, lat 17°30'30", long 80°20', There are five seams . the thickness of one was not ascertained, those of the

# Since opened out

#### COAL.

#### Coal fields of India.

others are respectively 6, 3, 3, and 34 feet. This coal answers well for smithy purposes and stationary engines, and was found to be a serviceable fuel when tried on the Madras Rails ay Rails ay communication is now being rapidly pushed forward, and a colliery being started, coal reported of high quality

"Kamaram—Lut. 18°5', Long 80°14' Two seams of fair coil, 9 and 6 feet in thickness respectively The available coal is estimated at 1,132,560 tons, its position is, however, unfavourable to its development "Tandur -Lat 190, Long 70°30 This village is situated about the centre of a strip of Barakar rocks, extending from Kairgura to Aksa-

pali, and contains a 15-foot seam of fair coal "Antergaon - Lat 19°32 30", Long 79°33'. South of this place a 6 foot seam occurs, a inches of which are shale

"Sasts and Paons - In the Nizam's Dominions, included in the Wardha area, a 50-foot seam occurs here, a considerable portion of which is of good quality. 30,000,000 tons of coal are estimated to be available from this source

"Talchir, in Orissa,-The field is situated in the valley of the Brahmini, and it is about 700 square miles in extent. The coal is of an inferior

The field has not been practically explored

"Rasmahal Hells -Over about 70 square miles on the western margin of the Raimahal Hills, coal measure rocks are exposed, and these doubt less extend over a visily greater area under the younger formations Separated by these overlying rocks there are five distinct fields, namely. Hura, Chaparbhita, Pachwara, Mohowgurhi, and Brahmini There is no continuity of the seams in each of these, while the data about them are very vague and incomplete If the coal measures extend below the trap to the east, they would be close to the water carnage of the Ganges and hence transport would be cheap, but on the other hand the coal of this region is for the most part stony and bad

"Deogarh -- In the Jainti, Sahajori, and Kandit Karaiah fields, coal of different qualities occurs Some in the Jainti field is excellent, but that

known from the Sahatori area is inferior

"Karharbars or Kurhurbals, in the district of Hazaribagh -This small field, having an area of 8 square miles, is of great importance on account of its position (about 200 miles from Calcutta by rail) and the good quality of its coal. The coal occurs in three principal seams, with an average total thickness of 16 feet, the estimated amount of coal is about 136,000,000 tons, while the available portion is estimated at about 80,000,000 tons, for steam work it is on the average superior to that of Ranigan. The chief companies possessing mines in this field are, the Fast Indian Railway, the Bengal Coal Company, and the Ranigan; Coal Association Should the output use to 500,000 tons per annum, as is likely, the life of the coal-field will be 162 years

"Ranigans or Raneegunge -This field is situated on the rocky frontier of Western Bengal at a distance of 120 miles from Calcutta, The available coal, exclusive of waste, is estimated in round numbers at 14,000,000,000 tons The total area exposed is about 500 square miles, but the real area is possibly even double that, as the beds dip to the east under the alluvium. This is the largest and most important coal field in which coal is norked in India, its proximity to the main line of rulway, and to the port of Calcutta, tending to give it pre-eminence over other less favourably saturated localities. The principal Companies engaged here in the extraction of coal are —the Bengal, Barakar, Equiable, New Birbhoom, and Run gang Association, besides many minor firms and name associations. Many of the cams are of considerable thick-

ORISSA 2427 BENGAL. 1418

Coal fields of India.

(H R Medlicott.)

COAL.

ness, one containing from 70 to 80 feet of coal. As a rule, however, the best coal is not found in the very thick seams `amuda

in the varv a

good deal, but there is much valuable fuel; the estimated available coal is he immediate futur . communication

vould bring it

into communication with the proposed railway

"Bokaro,-This field is situated in the Damuda valley and commences at a point 2 miles west of the termination of the Jharia field; its area is about 220 square miles The quality of the coal is fairly good. Some of the seams are of a large size, one being 83 feet in thickness: there is here a large store of valuable fuel available (about 1,500 million tons)

by the natives and carried to Ranchi for sale

"North Karanbura -Situated at the head of the Damuda valley, has an area of about 472 square miles, and the estimated amount of coal is

8,750 million tons

South Karanbura -Situated to the south-east of the northern field, has an area of 72 square miles, and the estimated amount of coal is 75 million tons. The assays of some of the coal indicate a high calorific power

"Chope-Is a small field of less than a square mile in extent. Situated on the Hazaribagh plateau

"Ithurs, 25 miles north-west of Hazaribagh. A few scams of inferior coal are exposed "Aurunga -In the district of Lohardaga, in the valley of the Koel, a

tributary of the Son The area is 97 square miles, and the estimated amount of coal is 20 million tons, but the quality of the coal as taken from the outcrop is poor "Hutar, to the west of the Arunga field has an area of 78 6 square

miles The assays of the coal gave favourable results.

"Daltongany, also in the valley of the Lock, area 200 square miles The seams are not numerous One, which has a thickness of Greet, contains excellent fuel. The estimated total available amount of coal is 11,600,000

"Tatafans, Iria, and Morne-Situated in the valley of the Son MORTH-WEST and tributaries. These fields are portions of a large tract stretching far to PROVINCES. the westward Several coal seams of workable thickness and many thin ones exist

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"Singrowli _ In of come of annual come and which is now abar "Solingfur -1

of cost and 2d1 25

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	Dittonary of the Economic
COAL.	Coal-fields of India.
	"Umaria —This field is more conveniently situated as regards railway communication, and is that where successful workings have lately been established, and good coal obtained that gave excellent results. This field with a proved area of about 3 square miles, and an estimated amount of its commanding on the fact.
	and a thick seam of good coal has been proved.  "Intimit—Is another area of about 41 square miles, in which seams of some promise have been observed.  "Bisramply—Has an area of about 400 square miles occupying the central basin of Sarguja; it contains some good coal suitable for locomo-
CENTRAL INDIA. 1420	tives. "Lalhangur—South of the Bisrampur area, holds some seams of good in the Mahanadi salley.— in area of at least 1,000
1420	square miles; some of the seams are very thick, two being respectively op and 168 feet; but though including good coal they often contain a large proportion of shale, and the horizontal extension of the seams is sometimes irregular and uncertain. These fields will probably assume importance in connection with the line to connect Calcutta with the Central Provinces. The recent boring experiments show that the Korba area has proved most worthy of consideration, particularly at Ghordewa, 9 miles to west-north-west of Korba, where there is a 5-foot seam of good coal.
CENTRAL PROVINCES. 1421	"Satpura Basin, south of the Narbada Vailey.—The Mohpon field is of importance in consequence of its position with reference to the Great Indian Peninsula Railway (of miles by rail, west-south-west from Jabalpur) The coal is worked by the Narbada Coal Company and supplied
	field
(	are of
{	ige of nams
HYDERABAD. 1422	three seams of coal, with a maximum total thickness of 30 teet.  "Wardha (or Chanda), 8'c—Includes, with several other areas, Sasti and Paom in Hyderabad, in which coal has been proved to exist. There are about 1,714 million tons of coal available, 215:
	Varora basin
BOMBAY.	The only pits worked in this wide area are at Warora, whence a special branch line conveys the coal to the Nappur branch of the Great Indian Pennisula Railway.  "Gutch.—There are a few thin shally seams at Trambal (Tromba Trambal) about r miles portheast of Ruy in a stream north of
	Sis-agad, and in a stream west of Guneri near Lakhpat. Besides these jurassic seams, there are some tertiary carbonaceous layers of no promise C. 1423

304	Dictionary of the Economic
COAL.	Coal-fields of India,
	"Umaria—This field is more conveniently situated as regards railway communication, and is that where successful workings have lately been established, and good coal obtained that gave excellent results. This field, with a proved area of about 3 square miles, and an estimated amount of 28 million tons of coal, is of great importance on account of its commanding geographical position (34 miles from the Katni station on the East Indian Ruilway), and its being the nearest source for the supply of the North-Western Provinces and the Panjab.  "Korar—Three miles north of Umaria The area is 9 square miles, and a thick seam of good coal has been proved." "Intimit—Is another area of about 41 square miles, in which seams of some promise have been observed." Buranipur—Has an area of about 400 square miles occupying the central basin of Sarguja, it contains some good coal suitable for locomotives.
GENTRAL INDIA 1420	"Lakhanpur—South of the Bisrampur area, holds some seams of good coal, the area is 50 square miles. "Rangarh, Hingur, Udaipur and Korba fields in the Mahanadi valley,—With the other associated rocks, these occupy an area of at least 1,000 square miles; some of the seams are very thick, two being respectively 90 and 168 feet, but though including good coal they often contain a large proportion of shale, and the horizontal extension of the seams is sometimes irregular and uncertain. These fields will probably assume importance in connection with the line to connect Calcutta with the Central Provinces. The recent borning experiments show that the Korba area has proved most worthy of consideration, particularly at Ghordena 9 miles to nest north west of Korba, where there is a 5 foot seam of good coal
CENTRAL PROVINCES 1421	"Satpura Batin, south of the Narbada Valley—The Mohpun field is of importance in consequence of its position with reference to the Great Indian Peninsula Railway (gs miles by rail, west south-west from Jahalpur). The coal is worked by the Narbada Coal Company and supplied to the railway, but the supply falls short of its requirements. "Shahpur (or Betul) on the south of the Tana valley—This field contains seams of irregular thickness and inferior quality. "Peuch Valley—There are many coal seams, some of which are of
Hyderabad 1422	considerable thickness, and the coal often of fair quality "Wardha-Godavar Valleys—The Bandar field—near the village of Chimir, 30 miles north-east of Wardra in the Chanda District, contains three seems of coal, with a maximum total thickness of 38 feet. "Wardha (or Chanda), 8'c—includes, with several other areas, Sasti and Paom in Hy derabad, in which coal has been proved to exist. There are about 1,714 million tons of coal available, vis  Wardra basin Ghugus Wan Between Wun and Papur Between Japara and Ch cholt 75 Between Japara and Ch cholt 75
вонвач. 1423	Sati and Paoon (Nuam's territory) 36/ The only pits norked in this wide area are at Wardra, whence a special branch line conveys the coal to the Nagpur branch of the Great Indian Pennisula Rulway. "Cutch—There are a few thin shaly seams at Trambal (Tromba or Trombow), about 5 miles northeast of Buy, in a stream morth of Sis-agad, and in a stream west of Guneri near Lakhpat. Besides these juriassic seams, there are some tertiary carbonaceous layers of no promise

Coal-fields of India.

(H. B. Medlicott)

SIND. 1424 TRANS INDUS 1425

COAL.

"Shahrig —On the Harnai route, there are outcrops of several thin seams of tertuary coal, none being 2 feet thick, while the greater number are under 6 inches. Some of the coal is of fair quality and would be useful for local purposes. The latest reports give a 6 foot seam of coal near Kosht; but the dip is said to be as high as 45" which will militate greatly against its

profitable extraction.

"Chamarlang, in the Luni Pathan country, about 75 miles from Dera Ghazi Khan—There are several seams of tertiary coal, of which the

am of tertiary coal also said to occur Hissarlik), and at

containing coal.

"At Kalabagh nummulatic coal exists in very small quantities in the almost hales, the so-called Kalabagh coal consists of carbonized wood in a bed of jurassic shale, of which it forms with to jeth part or less.

Sall Range proper -- Nummultic coal is found at Amb (or Umb). Sunglewar, Chamil, Kutta, Sowa Khan, Deiwal, Nurpur (Nilawan), and spect of being profit-

thich coal is seen at The later developcommunication, has

s rapidly approaching completion, and promises, notwithstanding the thinness of the seam, and the friable and pyntous condition of the coal, to be a fairly remuners.

in places. As the locality is near a good road a fair amount of fuel might be obtained, for the coal contains less pyrites than elewhere. At Bhygynwalla, the aware of the same is a single same and attends for 2 miles, the coal is mingle coldes amon as default contains much pyrites. By means of suitable workings good masses of bright coal might be obtained, and though the locality is difficult of access, it might be improved in this respect. The available coal is estimated at 16,20,000 maunds (60,000 tons).

"North-West Hindley as - At Dandli, near Koll, on the Punch, and at the north-west shoulder of the Sangar Marg Mountain, there are beds of nunmultuc coal, the postton of which, low ever, seems to preclude the possibility of successful exploitation. The latter field has been recently examined, and seems to hold out a fair prospect of success."

"Coaly matter and lignite occurs sparsely in the Smalik sandstones of the sub-Himáliyas, and has frequently given tive to false hopes of the discovery of workable coal in these regions. There is, however, no probability of such being met with.

"Sittim - There is a coal-field in the Darjiling District which occup es a narrow zone stretching along the foot of the Himilay as from Pankahari

Panjab, 1426

HIMALAYAN.

COAL. Coal-fields of India. to Dahngkote, the corl is of Gondwana age and is much crushed, some of it is in the form of a powder, and has assumed the character of graphite ASSAM " n .fla Hills -A seam of Gondwana coal, 5 to 6 feet in thickness, 15 1428 Il probably never possess any economic value *accous and nummulatic coal occurs. basins are situated there are-great difficult the coulto market The 470,000 tons in the Jaintia Hills, exist at five localities, vis , Am-ur, and Shermang At La ka-dong th irregularly developed, but its amount is estimated at 1,500,000 tons "Garo Halls - The Daranggin coal-field (cretaceous) contains a 7-loot seam of coal, favourably situated for working, but at present useless for want "Upper Assam -There is an important field at Makum which is being worked by the Assam Trading Company, it contains several seams of coal, one of which is over too feet thick, 75 feet being good coal beds are disturbed and the coal seams lie at an average angle of about 40°, so that some difficulty may be met with in working them. An approximate estimate gives 18 000 000 tons as available, supposing the workings to be nowhere carried more than 200 yards from the face or 400 feet to the deep. at Entain for the most part orkable seams is estimated to what may be ", of poor quality -Some of the seams in this field are of nd over, the estimated quantity available 15 10,000 000 tons "Jangs and Disas .- Iwo small and unimportant fields in Upper "Arakan -In the Arakan Division, at the Baronga Islands, on the BURMA. western coast of Angara Khyong, about 2 or 3 miles from its southern 1420 Tsetama, two seams occur, one of which has a thickness of a icci, a a the other of 2 feet 5 inches A 2-feet 6 inch scam of similar coal occurs on the Cheduba Land "Pegu -Coal was discovered in 1855, and a mine opened at Thiyetmyo, but after a few cwts had been extracted, the work was abandoned on account of the seam dying out further explorations have been recently carried out At Dalhousie, near the mouth of the Bassein river, and in other places, traces of lignite, which have at times given rise to al occur ry rocks at a number of localities those at which the coal may possess a possible value are Thoo-hie-khyoung for Thatay Kyoung) on the Great Tenasserim river, where a mine was formerly worked by Government but subsequently C. 1420

Coal and Coal-mining in India.

(W. Suise.)

COAL

abandoned. This seam was 11 feet 81 inches thick, of which 6 feet 8 inches were true coal. At Hienlap for Hienlat, about 6 miles from the last locality, there is a seam from 17 to 18 feet in thickness, and the coal is of pretty uniform character with conchoidal fracture. Three quarters of a mile

quality is such that if found in iny purposes.

I ingadaw (on the western banks

, the seam is and rapidly on the upper radaw. The

like resin. The thickness is 3 feet 9 inches to 4 feet; both floor and roof are good. On the Chindwin river near Kalewa is a 10-foot seam of creaceous coal; it is well situated for transit purposes. On the Paulwing river there are numerous irregular thick seams of tertiary coal.

"In the Andaman and Nicobar Islands coal is known to exist; but so far as they have been examined there are no grounds for belief that a valuable deposit of coal occurs. (See Manual of the Geology of India, Part III.)

andaman. 1430

1431

1432

INDIAN MINES

Water transfer to the state of 
Indian coal up to present date:-

INDIAN CONSUMPTION OF COAL.—"The coal and coke used in India are either imported or raised and made in the country. The foreign sources of coal and coke supply are Europe, Australia, and Africa. Taking coal first, the proportion of coal raised in the country and that imported is as under—

2,216,000

"The value of the former is stated to be R1,09,05,047. The value of the latter at the pit's mouth may be taken at R38,45,000. The imported coal is chiefly large or steam coal The marketable *coal rased may be taken at 1,200,000 tons yearly, the balance being either used as coke or allowed to go to waste. Of the marketable coal the largest proportion is steam and rubble which are used on railways to a large and in steamers

* See page 388, C. 1432

2 C

COAL

1433

### Coal and Coal-mining in India

to a smaller extent. The small kinds of rubble or smithy are used in stationary engines for smithy purposes, brick burning, and ime-burning

"The quantity of Indian coal used on railways in 1884 was 436 So, tons, the quantity of imported coal being 197,342 tons. The imported coal is used on railways unfavourably situated as regards Indian coal fields, QUALITY OF INDIAN COAL—"The quality of Indian coal viries much. Below is a table of ultimate analyses of specimens from Karbarbari.

and Rangam coal-fields with analysis of English and Weish coals for comparison:-

		~~				
Coat-Field	Carbon	Hydrogen	Oxygen and Nitrogen	Sulphur	Ash	
 Karharban E I Ralway Ranganj (N B Coal ) Co.)	78 20 70 93 74 31	4 34 4 10 5 12	7 89 12 49 9 67	6 42 0 52 0 47	9 15 11 96 10 43	Main Seam Upper Seam
England {Nencastle South Wales	82 S3 88 47	5 32 4 59	7 13 3 02	1 17 1 25	3 55 3 09	

[&]quot;It will be noticed that in several particulars Indian coal is inferior to English, 1st, in containing more ash, and 2nd, less carbon and hydro-

"In the table below the commercial analyses of many Indian costs b I the writer and Mr T H Ward F G S, are given, as also commercial analyses of Newcastle and Welsh coals, for comparison —

Coal-fifld.	Spec gravity	Ash	Fixed carbon	Volat le matter	Sulphur	Heating power by Thomson : calor meter	
Karharbari (Lower seam Upper seam Upper seam Seam Upper seam Seam Upper seam Seam Seam Seam Seam Seam Seam Seam S	t 35 t 33 t 359 t 327 t 439 t 390	9 15 11 96 14 96 17 27 7 64 10 03 9 59 27 68 16 03 13 55 8 99 13 68 3 68 3 49	66 84 60 46 60 86 64 25 49 61 60 70 53 70 65 22 71 77 57 95 42 85 50 c0 53 42 82 66 63 25	36 75 7 10 12 20 28 50 48 16 36 44 44 98	1 35 1 56 Trace 0 849 7 85 2 52	13 20 12 89 13 89 13 89 12 33 12 40 13 05 13 99	Not worked Not worked

[•] The above table shows that there is great diversity in the chem stry of the coals of India and the variations in physical features are just as marked With the exception of Tindaria and Assam coal, all Indian coals are remarkably laminated in structure, the laming consisting of a dark highly

Coal and Coal-mining in India.

(IV. Saise)

COAL.

1434

has a very peculiar fracture and breaks into small pieces. Other Indian

Varora coal breaks like shale Karharbari and Ranigani

Karharbari and Raniganj
"he coal of Karharbari,
although behind the

the Newcastle coals, and are much of the same character, possessing a large percentage of volatile matter.

COMPARISON OF INDIAN WITH IMPORTED COAL FOR RAILWAY PURross—"The Indian and imported coals have been tried on Indian Railways with the following results:"

EAST INDIAN RAILWAY.

Gross Ib per h per COAL. weight of mile of coal ton mile. trains consumed Tons cwts Karbarbari 145 207 10 30 12 Raniganj Sanctoria 151 212 17 32 21 Equitable 203 33'68 .191 Ordinary 204 14 36 98 .181 North Wales 215 9 31 90 *148 South Wales, Cardiff New South Wales . 160 201 11 207 .121 14 31,43

D. W CAMPBELL.

Locomoire Supdt , East Indian Railway.

Coal										ss at of ins	D per mile of coal consumed	ß per ton mile.
Karharbari Raniganj Barakar I I othergills (S North Wales Australia Duckenfield Merthyr Godavari		w	: ;	:	:	:	: :		Tons 166 181 170 183 174 150	Cuts. 12 7 3 12 9 4	25.76 33.33 30.04 30.45 27.13 27.43	*155 *184 *177 *165 *155 *133

F. H. TREVETHICK, Locomotive Supit., Madrat Railmay,

COAL,

### Coal and Coal mining in India.

"It will be seen from these results that Karharban coal is a good stem coal, little inferior to imported coals, and that the other Indian coals texcept Goda vir) are of far quality. Umaria coal, tried on the Great Indian Pennsula, gave 42 64h per train mile with a gross load of 410 tons. This nearth but not pour as most as Chestala.

ons This is nearly but not quite as good as Karharburi coal Indian Production -"The sources of Indian coal supply and the

estimated searly output are as under -

CENTRAL	Pro	VINC	Es {Narbada	:		# 100 non 23 non
DENGAL			(Umaria   Karhaibar   Ranigan _i	1	•	7 290 • 5°0 000 • 50 005
Извли		•	, ` " ,	•		\$0 000
						1,572 "00"

As the newer fields develop this estimate will have to be increased

DISTRIBUTION OF INDIAN SUPPLY—"The Water coal-field is connected with the Nappur branch of the Great Indian Pennsula by the Wardha Coal State Railway, the Mohpana (Narbad) coal field by a branch from Gadwara with the Great Indian Pennsular The Umaria coal-field has been tapped by the new line from Kutin through the East Indian Railway, Jubbulpur him. The Assam coal field is connected with the Brahmaputer area by a line from Distribugarh.

"The coal from the collieries of the Central Provinces is used on the following railways Great Indian Peninsular, Rajputana Malwa, Wardha Coal State Railway, and the Nagpur-Chattisgath, the smaller coal going

to mills

"The Bengal coal finds its way to the Panjab railways and the railways of Bengal, as also into the manufactories of Calcutia and the large cities along the line of railway. Some is used in the steam ship lines Small coal is largely employed for brick making. Comparist should enders vour to create a want by teaching the people how to use small coal in large towns, such as Allahabad instead of wood and conducing. Agencies like those in English cities could probably do this in a few years, and the large waste of small coal that goes on at present would thus be obvisited.

### MINING IN INDIA

"Has made considerable progress during the past few years, maching and well-appointed heapsteads and pit frames are coming generally into use

"In most cases the railway is brought close to the mines, and where this difficult, tramways of various gauges, worked by locomotives, carry the

coal from the mine to the railway wharves

"The seam is generally shallow, and engine-inclines or shallow pits give outlets for the coal. The two deepest mines in India are 230 shalt of the East Indian Railway Karharbari collieries, Bengal, 429 feet deep and the Helen Pit of the Narbada Coal and Iron Company, Central Provinces, which is 402 feet deep.

"The system of working varies very much At Warora, Central Provinces, where 100 000 tons per annum is wound by direct acting engines unto f two shifts 200 feet deep, the system most nearly approaches the

C. 1435

1435

It may be noted that it is the marketable coal that appears in the Government returns, not the actual amounts raised. In 1833 34 these were 1,200 957 tons. Confwith p 385-m26

COAL. Coal and Coal mining in India (II' Suse ) English No women day morning to Satu shifts of 8 hours each thus Galleries or bo " in height, leaving the roof coal, and pillars 40 feet square. The coal is so hard, it has to be nicked and undercut and then blasted down. The pillars are worked by splitting each from one headway to another and then taking the far end off in slices The roof coal comes with it "At the Mohpani colheries a similar system is worked culties met with in these mines, owing to the faulted and disturbed nature of strata, are probably unequalled in India Karharbars coal field - 'Is the smallest field in Bengal It is mainly 1436 worked by three Companies-the Ranguage Coal Association, the Ben gal Coal Company, and the East Indian Railway The mines are connected with the main line wharves by metre gauge or 2 feet gauge lines worked by locomotives

a scene of great activity

During the busy season the coal-field presents

As much as 50,000 tons of coal and cole have been raised and despatched in one month. The coal-field is connected with the East Indian Rulway Chord line by a branch from Madhupur to Giridi, the terminus or colliery station. In mechanical arrangements for raising coal, this coal field is well advanced. The old fashioned gin is almost obsolete and bullock carts have little to do "The system here is similar to that obtaining all over Bengal working hours are from 6 A M to 6 P M, and perhaps later when extra work with him, carrying or training his coal. Picks of English pattern and make are now universal, the crowbar and single pick having been ousted The workings are on the bord and pillar system Pillars vary from 12 feet to 40 feet square and 40 feet x 60 feet. In the shallow mines eam r in hock

the front side When pillars are taken out the chocks are withdrawn and the roof falls

"The remarks on the Raniganj coal field given below apply in some

and Kols There are sor local men how to cut coal have discarded the Baun

the Bauris are not in such requisition as formerly

"Drainage is effectively carried out by Tangye's special and lifting and forcing pumps, worked by bob-levers from horizontal engines. The machinery is of good type, and winding and hauling are done by good engines.

"Ventilation is attended to in the deep mines, mainly by furnaces or steam-jets

COAL.

1437

## Coal and coal-mining in India.

huts of mud walls of brick . e huts consist of one room. * re. Those better off have consheds and granaries; these two latter with the dwelling forming three sides of a quadrangle. The larger proportion of the labourers cultivate during the rainy season and work at the collieries only in the cold and hot scason, say from October to June. Some of the labouters have settled down to coal-cutting as a calling, and these work constantly, always excepting Monday, which is invariably a holiday.

"Coal-cutting is paid for by contract, at so much a tram or bucket; these

the arr smithy for smiths' forges, &c., is also made to a large extent, about 7,000 tons per annum being the outturn.
"The following notes on the Ranigani coal-field are by Mr. T. H.

"The Chord line, East Indian Railway, passes across this coal-field, and the collieries are clustered on either side and along the Barakar branch. - +1

which they sang as they tramp round and round.

"The sinking in the district is easy, through sound sandstones, no brickwork being required to protect the sides. Heavy water is sometimes met with.

"The coal in the east of the field is very strong and non-caking. The sandstone roof is also very strong and comes right down into the coal. Practically no timber is required in working the coal in the manner described below. In the west of the field at Sanktoria, for instance, the coal is not so strong, though the roof is everywhere the same. From Belroie, near Sitarampore, westwards, the seams worked are all coking coals.

"The seams worked are seldom less than 10 feet and sometimes reach 18 feet in thickness. In the Barakar Coal Company's Komerdohi colliery and the Bengal Coal Company's Liakdi colliery on the west of the Barakar, the enormous thickness, of upwards of 80 feet, has been found. This seam has, up to the present, only been quarried at its outcrop. It dine or I in a or s to the south.

with reference to the prejudice

Coal and Coal-mining in India.

(W. Saise)

COAL.

considerations. Gallenes are excasated to the full height of the seam tz feet to 16 feet in with Jeaving square pollars of a yrang sizes to support the roof, many acres being thus often left on pillars. The natice cooled insus (and he has been excasated. It is clief and dearly-nized weapon is a 'sabal' or crowbar with a sharp point at one end. With this he smakes the cool, standing always when at work. He never grooves beyond the first 'cleat'; gangs of 4 or 5 men occupy each gallery; they are paid by the bucket or train of steam coal or small delivered at the pit bottom. Hany timber has to be set in a working place, a man of the carpenter caste (Chidar) who is paid a duly wage must be sent for the purpose. "Women and children work underground, and are principally em-

ployed in carrying the small coal and dust. They are also paid by the

"Access to the mines is very generally by inclines opening to the surface.
"In the eastern part of the district the seams are for the most part flat, in the central and western parts the strata are often steep (the general strate are often steep). The following the strate are of th

has been

the Barakar) belonging to the Bengal Coal Company was abundoned some years ago after an explosion in which several men were burnt, some of whom died. At Sanktoria, also belonging to the Bengal Coal Company, some men were burnt in 1883

The quarries at Komerdobie and Liakdi have already been mentioned. Thousands of tons of coal have been won from the outcrops

on Mondays. For the rest he is good fempered and improvident. It is a difficult muter to persuade him, although he is always paid a ticcal contract) rate for his work and could easily increase his carnings, to do more than will, with his wife's contribution, keep the household in rice and himself in druk for the day. The nearly universal and very bad custom in this district is to pay each evening for the work done during the day. The collier or cooly has often to what about until 8 or 9 r.m. for his money. He then goes cheerfully home and remains up half th.

in his the mc of cou

day in He go

he cuits. Every morning he draws at the godown sufficient for his requirements during the day, and an allowance of cotton thread or old rags to serve for wick. This oil he burns in a 'chirag' or small piece of stone hollowed out into the shape of a boat (a piece of tile from the roof of his house is often substituted). In this he places a small quantity of oil and I

COAL.

#### Trade in Coal

a portion of wick. Any oil he can save from his 'allowance' is his perquisite and he can carry it home. Mohawa and castor are the chief oils used. Some of the mines are lighted by kerosine, burnt in small tin lamps, holding about 2 ounces with small circular wicks. The native does not be a sounced to see the second of the

tinr

The great freedom from fire damp pt this question in the background gnised that his health and longevity

is in question, and he has besides helped much to prevent rentilation becoming a necessity by the wonderful power of endurance he has shown This power of endurance enables him to work for hours at the bottom of a sinking shaft with water pouring over his naked body or to work all day long and day after the bottom of test from any air c

steam This want c

and ought to be speeuty remedied

GENERAL CONCLUDING REMARKS BY DR SAISE —The coal industry in India employs about 30,000 persons, the quantity of coal raised per annum per person employed, surface and underground, being 51 tons "In Europe the numbers are different, varying with the thickness of

seams and nature of difficulties met with

England (average)

348 tons per person employed underground and surface per annum

Belgium Saarbriickin 134 Ditto

Ditto.

There is no Government regulation of the coal industry, any person can manage a mine on any system he likes, whether or not he has experience or training Interest has a great deal with the appointment of the managing staff, and it is to be feared that the best is not made of the splendid coal deposits the foundation of the scame in voluntions of the scame in the staff.

1430

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### TRADE IN COAL

The following brief note prepared by the Revenue and Agricultural the internal and

of in India may

be estimated at two m'llion tons of which three-fourths of a mill on tons are imported from the United Kingdom and one and one fourth million

the amounts of fuel consumed by the 1885 to 1887 as given in the last Rail

the of treport -

	C	340	-	1	1	
Year			-	Coke	Patent Fuel	Wood
	Engl sh	Count	Ł			
	Tons	Tons		Tons	Tons	Tons
1887 1886	212 529 240 063	479 21 450 94	1	9 564	30 029 26 212	252 508 259 513
1835	235 721	476 27	7	10,439	23 117	255 178

#### Trade in Coal.

COAL.

In 1886 there were 99 collieries in Bengal (of which, however, 37 were closed), 2 in the Central Provinces, 3 in Assam, and 1 in Umeria in Rewa (Central India), or 105 in all, of which 68 were actually worked. The output was returned as follows -

 as returned as r	Ullo				Tons
Bengal .					1,187 000
Central Provinces					117 300
Assam					70,800
Central India			•		13 500
				TOTAL	1,388,600

Assam has since increased its output, the figures for 1886-87 being returned at 72,000 tons Report for 1886-87 that-It is stated in the Railway Administration

"Coal continues to enjoy the confidence of the public. Its sale to the river steamers and tea factories is increasing. It has been contracted for by the Dacca State Railway, the Kaunia Dharlla State Railway, and the Eastern Bengal State Railway-b

It is being largely enquired for by the

Calcutta, also by the Eastern Benga been found suitable to the engines of the Darreeling-Himálayan Railway and the Northern Bengal State Railway, but the difficulty of access to these two railways from the river Brahmaputra prevents its extensive use by their administrations. The coal continues dusty, though it is being mined deep in the hill sides. But its nature is beginning to be understood, and its friability is not found to be a drawback to its use as a steam fuel

"The coke is found to be saleable to the tea factories of Lakhimpur to an extent of about 3 000 tons per annum. The Company is preparing by means of an increased labour force to enlarge the output of coal to 100,000

tons yearly"

Collieries have recently been opened out at Dandot (Panjáb) and Singareni (Nizam's Territory) The coal in these mines has been pronounced of good quality, and in Upper Burma coal has been found (in the Kali Valley on the Chindwin River), but arrangements have not as yet been made to work this new source of supply

Mr O Conor, in his review on the Sea borne Trade Returns for

1878 79, gives the following historic sketch of the Indian coal industry,—
"Coal mining in India is rapidly attaining considerable importance The commencement of this industry appears to date back to 1620, when a mine was opened in the Ranigani district in Bengal For twenty years no new mine seems to have been opened, and then only three mines were opened down to 1854. In that year the commencement of the East Indian Railway line, which was laid to run through the coal bearing regions of the Damuda basin, gave an impetus to the mining industry and new pits were opened in larger numbers-2 in 1854, 3 in 1857, 3 in 1859, 3 in 1860, 2 in 1861, 1 in 1865, 2 in 1868, 1 in 1869, 3 in 1870, 2 in 1871, 1 in 1872, 3 in 1873, 7 in 1874, 5 in 1873, 3 in 1873, 6 in 1873, 1 in 1874, 3 in which contain now altogether 56 mines at work. In the Central Prov. inces also the coal fields of Narsingpur and Chanda have been utilized for the purposes of the Great Indian Peninsula Railway"

In the paragraph above the number of mines in 1886 87 is stated to

have increased to 105
FOREIGN TRADE -The total imports into India of coal (including coke and patent fuel, of which a small quantity is received) have more than

FOREIGN TRADE

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#### Trade in Coal.

doubled themselves since 1866-67, having risen from 315,000 tons, valued at R55 likhs, in that year to 765,000 tons, valued at R150 likhs, in 1886-87. The United Kingdom supplies nearly, all the imported coal, though Australia, which ranks next to it is a source of supply, is now sharing more largely in the imports, the value of its consignments in 1886-87 being R4.75 likhs against R1 to likhs in 1866-67. Most of the imported coal is for steamers on their return liveney from

Bombar Couls for steamers on their return junney from Lower Burma Lower Lower Couls from the Indian coal-fields to remote from the Indian Co

INTERNAL TRADE Statistic

INTERNAL TRADE—Statistics may now be given regarding the internal movements of coal by rail during 1856-37 between the different blocks (i.e. provinces, chief towns, and Native States). The total trade amounted in quantity to 1,097,800 tons and in value to R153 83 likhs. The position of each block as a net exporting or importing centre may be thus indicated.—

Exports.	Tons.	Imports	Tons
Bengal	. 743 000	Calcutta	504 000
Bombay Town	162 000	Bombay Pres dency.	161,000
Central Provinces Karachi Assam	44 000 7 000 4 000	North Western Pro- vinces and Oudh Raiputana and Cen	161,000
Madras Town	7,000	tral India	66 000
Madras	1,000	Punjab	35 000
	-	Berar	23 000
		S nd	3 000
		Mysore	4 000
		Nizam s Territory	3,000

As might be expected, Bengal, where the most extensive mines in India are situated, takes the lead among the exporting centres. Of its exports, Calciutta took I six year 68 per cent, the North Western Provinces and Gould az per cent. Rejutuana and Central India of oper cent and the Punjab 4 per cent. The consignments from Bombay Town which consist mostly of English coal, are conveyed principally to the presidency mills, the balance of the foreign imports being used by the shipping and the town mills. The exports from the Central Provinces go to Berri and the Bombay Presidency. Clicuita the North Western Provinces and Oudh, and the Panjab virtually receive their entire supplies from the Bengal mines. Rajputana and Central India draw their largest supplies from Bengal. Berar imports its coal mostly from the Central Provinces, Sind from Karachi, Mysore from Madras and the Nizam's leritory from Bombay Town.

The development of the coal industry in India is indicated by the fact that the gross exports from Bengal to other provinces and Calcutta have increased from 64,1807 tons in 1882-83 to 755 831 tons in 1886-83, and those from the Central Provinces from 26,451 tons to 56,125 tons during the same period. Assam for the first time shows a net export (4,000 tons), in referring to which the Director of Land Records and Agriculture writes—"This is entirely due to the increased output of the Makum coal-mines near Dibrugach, which now supply nearly all the coal used in

the Assam Valley, besides furnishing large quantities for export "

1442

Coke. (A note contributed by Dr. W. Saise)

"Coke is imported and also made in India In 1833 84 the imports
amounted to 16 700 tons valued at R4 is 738 Coke, however, is now
made to a very large extent in Bengal It is a most important industry in

1442

Cobalt.	COBALT
of coke means the utilization industry is of recent and nece 1875. There are two the used for formerly and focomotive purposes. It is made thiefly in one on consisting of two walls 6 to 8 feet high, 8 to 9 feet apart, and 40 feet in the purpose of supplying a more or less smokeless fuel. It supplants	
charcoal for cooking purposes and small coal for smithy purposes.  "The traffic returns on the East Indian Railway, which taps, with the exception of the Assam field, the whole of the coke-making districts of India, shew that in a year about 55,000 tons of coke, exclusive of foreign pect-portanual company of the perturbation	1443
Hard coke for foundry blast furnaces, locomotive, &c	
Soft coke	
oking oking	
te out	
collieries."	{
COBALT.	1444
Cobalt; Ball, Econ. Geol., 324 & 616; also Mallet, Mineralogy, 27.	
Cobalt metal is never met with in the native form, except in small percentions as a constituent of thefly in primitive rocks and a tain nackel, iron, and often bi sulphur or by arsenic, or by	
Speiss Cobalt or tin, white Co	
Linnzeite or Cobalt Pyrites Co S+Co, S ₃ .	
Source.—A complex mineral (sehta) is found in various mines in Mr. Mal-On ana.	1445
Sulphur	
Antimony 43 87	
Cobalt a trace.	
Iron	
Gangue	
100°26	
· · ·	
C. 1445	

COBALT.

#### Source of Cobalt.

This substance is generally known as Cobalitie In the Rasputána Gazetteer, and in the Fury Reports of the Exhibition of 1862, occur accounts of the Jeypur enamels, but in a recent publication, Dr T H. Hendley (Fournal of Indian Art), gives more precise details Sir George Birdwood (in his Industrial Arts of India) under Enamels (pages 165-168) and also under Pottery (pages 301-324), gives most instructive particulars regarding the Indian uses of Cobolt. He states. "The rita or naffre is the black oxide of Cobalt found all over Central and Southern India, which has been roasted and powdered, mixed with a little powdered flint" (p. 308) Mr. Ball says, while speaking of the Jeypore blues in enamelling, "The production of the colours was a secret only known to certain families, except as regards the different shades of blue, which are stated"" to be produced by an oxide of Cobalt This oxide is doubtless prepared by roasting the Cobaltite" The various authors who have described Cobalitie, in the Records of the Geological Department, seem to be unanimous in their opinion that Cobalt is only rarely met with in India, and that, too, in the mines of Raiputana alone (as far as peninsular India is concerned), and that the oxide is artificially prepared, in other words, that it does not occur naturally in Central and Southern India The art of producing a rose colour enamel on gold with cobalt seems still to be a secret with the minakaris or enamellers of Jeypore Cobalt minerals are also said to occur in two other localities-Nepal and Burma

1446

Economic Uses -Under the head of "Clays used for Pottery" (C 1333) will be found some account of the uses of cobalt in the ceramic industry while in the above remarks reference has been made to the nobler art of enamelling. In a work specially dealing with economic products, it is perhaps unnecessary to enter at greater detail into a substance the uses of which are so intimately associated with the higher branches of Industrial Art Hendley says that the colours used by the Jeypore enamellers 'are obtained in opaque vitreous masses from Lahore, where they are prepared by Muhammadan manthers or bracelet makers The Jeypore workmen state that they cannot make the colours themselves The base of each colour is vitreous and the colouring matter is the oxide of a metal such as cobalt or iron. Large quantities of cobalt are obtained from Bhagore near Khetri, the chief town of a tributary State of Jeypore, and are used in producing the beautiful blue enamel." In these passages Dr. Hendley does not make it quite clear whether the Jeypore enamellers prepare their own material for the blue colour, though unable to prepare the other colours, or whether the entire mass of the crude material is conveyed to Lahore and other centres to be prepared and returned in its manufaccondition to the Jeypore workers in enamel He, however, proceeds known can be applied to gold Black, green, an neculiar salmon colour, can be used and a hate, black, and

to the 1
The pure ruby rea is enced workmen who can bring out its enced workmen who can bring out its facturers in N Ind ) gives some details regarding:

which he divides into two sections, riv. the makers of glass bing, do the mikers of it bangles Baden Powell (Panyab Manufactures) discusses the Multan enamel industry and furnishes particulars regarding the Mind blue vitreous enamel In the Multan Gazetter (p. 20) this subject is enlarged upon, and reference is also made to the Bahawalpur enamels, where, in addition to opaques, a semi-translucent sea green and also a dark blue are produced

eaulages

·	
Cocculus	COCCULUS villosus
In Europe Cobalt is largely used as a pigment and to colour ordinary glass	
Coccinia indica, W.&A, see Cephalandra indica, Nand, Cucurbitace &	
COCCULUS, DC, Gen Pl, I, 36, 961.	
Cocculus cordifolius, DC, see Tinospora cordifolia, Miers, Menis-	1
C, indicus (see Flück and Hanb, Pharm p 31), a commercial syno nym for Anamirta Coccilus, W & A, see Vol. I., A 1037	
C. Leæba, DC, Fl Br Ind, I, 102	1448
Vetn — I allur, illar billar, parmatit, vehr., P8, Ullar billar, Sind References — Gamble Man Timb, 11 Brandis, For FI, 9, Stemart, Pb PI, 6 Aitchison, Cat Pb and Sind PI, 3, Murray, Pl and Drugs Sind, 38	.}
Habitat.—A large climber of the dry and and zones, especially of Western India, the Fanjab, Suid, and the Carnaiu.  Medicine—Stewart says the stems often become as much as 3 or feet in girth 1 its used in Sind and Afghanistan in the treatment or intermittent fevers and as a substitute for Cocculus indices (Murray,	MEDICINE.
Dymock) Food and Fodder—In the Trans Indus, Stewart says, it is browsed by goats but by no other animals Said to be used as a partial substitute for hops in the manufacture of Indian beer (dfurray)	FOOD and FOODER 1450 Hop Substitute.
C palmatus DC san translus palmata Mura	Danstituto.

C. palmatus, DC, see Jateothiza palmata, Miers

C. villosus, DC, Fl Br Ind, I, 101

Vern—Famil & bel, hier, dier, Hind, Kursan, samir, Sind, Vasana eda, Mar, Wasanael, bareel, Boms, Astiuk kedi, Tan, Dusari tipe chip riv tige, kalle-tige, Tzi. In the Concan the Vaids give this plant the Sans name of Vandithila

This plant sometimes bears the name Farid-buts (a name which more correctly, should be applied to Pedalium Marex, so called in remembrance of the fact that Shaik Farid Shakar-gunjis supposed to have I ved on water rendered mucilaginous

by the leaves of that plant having been shaken in it) This same property is possessed by the leaves of Cottenius villosus

References—Gamble, Man Timb, 11 Rosb Fl Ind, Fd C B C, 732,

(under Mentspermann hirsultum, 11 illd.), Drury U Pl, 145 Dymock.

Mat Med W Ind., 2nd Ed., 32

Habitat -A large climber of the dry and arid zones, Sind, Panjáb, Deccan extending into Madras and Bengal

Medicine—"The Juice of the Leaves, mixed with water, has the property of coagulating into a green jelly like substance, which is applied externily by the country-people under vanous circumstances on account of its cooling nature, and is also taken internally, sweetened with sugar, as a cure for gonorrhea" Roxburgh says; "A decoction of the fresh roots, with a few heads of pepper, in goats' milk, is administered for rheumatic and old veneral pains, hall a pint every mortning is the dose It is reckoned heating, lavative, and sudonfile" By more recent writers the root is said to be alterative and to be a good substitute for saviapanila Dymock remarks that in the Concan the roots rubbed with Bondue nuts in water are administered as a cure for belly-ache in child-

s the 1454

1451

1452

MEDICINE, Leaves

**1453** 

Roots.

COCCUS The Cochinest Insect. cacti. ren; and in bilious dyspensia, they are giver in Gemests doses with ginger and sugres they are also an ingredient, with a number of bitters and aromatics, in a compound pill which is prescribed in fever. The Paarmacopara of India states that this possesses the bitterness and probably the tonic properties of gulancha (Tinospora cordifolia). Stocks alludes to this as a Sind drug under its barar name of ramer, and remarks that it is hy patients under FOOD. If suffered to stand 1455 for a few minutes, the jelly clears, "the gelutinous or mucilaginous parts separate, contract and float in the centre, leaving the water clear like Madeira wine, and almost tasteless." (Reab.) With regard to this property the remark under the vernacular name Farid-bill should be read. In Eastern Bengal the writer repeatedly observed the milkmen carrying milk to market with a few leaves of this plant and the spine-like leaflets of the date-paim placed in the ressel. On enquiry he was told these prevented the milk for getting bid through the heat and the shiking to which it was subjected. He has never been able to investigate this point further, but it is probable the leaves of the Cocculus are added more with the object of thickening the water-adulterated milk. A large amount of the milk brought into Calcutta is regularly preserved or adulterated in this manner. Dr. Dymock alludes to the fact that this plant was caten during the famine of 1877-78 in the Khandesh district, and that it is always more or less eaten in Kaladgi. FODDER. Fodder .- Roxburgh says thre goats, cons, and buffaloes eat the plant. 1456 DOMESTIC Domestic Uses. "The juice of the ripe berries makes a good, durable, bluish purple ink" (Roxb) 1457 COCCUS; Packard, Guide to the Study of Insects, 526. A genus of Insects belonging to the Coccide of the Order Hemiptera Several species are, by Entomologists, referred to this genus, but two only are of commercial importance, -the one a native of Southern Asia and the other of the Corn o lanes while the females have 9 jointed antenna and are covered by a flattened hemispherical scale 1458 Coccus cacti, Linn. THE COCHINEAL INSPCT; COCHENILLE, Fr; KOCHENILLE SCHARLACHWURM, Germ; COCCINIGLIA, It, COCHINILLA, Sp. Vern - Kirmdana, Beng, Kirmas, Boms, Kiranda, N.W. P, Kirm, Ps. References - Royle, Prod Res of Ind .57; Encyclop Britannica, VI .97; Balfour, Cycl of India; Liofard, Dyes and Tans of India, Wardle, Report on the Dyes of India, Buck, Dies and Tans of N.-W. P.;

### The Cochinest Insect.

COCCUS cacti.

Official Papers on Pigments used in India; Crookes, Dieing and

Habitat -The Cochineal insect was first discovered by the Spaniards in Mexico in the year 1518, but it was not made known to Europe until 1523 At first it was supposed to be a seed, but in 1703 Leeuwenhock showed it to be an insect. In Mexico it is particularly abundant in the provinces of Oaxaca and Guerrero. It occurs in many localities in Central America, and for long has been one of the most important articles of export from Guatemala, but it is met with also in South America, and recently it has been found (or perhaps only an allied insect) in the West

Indies and in the southern portions of the United States.

HISTORY. 1450

HISTORY AND INTRODUCTION.—The immense importance of the trade, early established in this insect, led to efforts for its propagation in other countries, and for many years this has been profitably prosecuted in Teneriffe, the Canary Islands, Java, Algeria, and to some extent even in Spain. According to some writers the best quality now comes from Honduras. The attention of the Court of Directors of the East India Company was directed to this subject by Dr. James Anderson of Madras in 1786. He forwarded to Sir Joseph Banks samples of a dve-vielding insect which was proved to be a species of Coccus, but not Cochineal.

leaves had withered. Neilson, on his arrival at

Neilson himself writes, on the 3rd August 1795, that he had the day before seen at the Company's garden near Calcutta about one thousand fine plants covered with the insects, enough to stock all India." (Royle,

Productive Resources of India, f. 60, published 1840.)

The above passage has been reproduced here as being the earliest and at the same time most complete account of the introduction of the Cochineal insect into India. Without learning the details we are next informed of its having been successfully introduced into South India, but whether from the Bengal stock or through some fresh effort, cannot be discovered. Passing over a gap of 60 or 80 years, numerous writers refer to "the indigenous insect" in such a pronounced manner as to suggest the doubt whether or not Captain Neilson's stock had, during that period, overrun the whole of India and become so completely acclimatised as to be in staken for and genous. Even Royle, in the above passage, alludes to the "and genous Opuntia," whereas no member of the family to which that plant belongs (except ti e Ceylon Rh. psalis) was known in the world prior Coccus cacti.

The Cachineal Insect

HISTORY

to the discovery of America, and therefore no Cactus can be called indigenous to India This is more than a quibble as to the correct usage of a scientific term If the Coccus sent to Sir Joseph Banks, one hundred years ago, was found feeding on a Cactus, it must be regarded as but an earlier introduction than the Cochineal brought to India by Captain It therefore seems probable that the Portuguese (or whoever introduced the Opuntia) may have intentionally or unintentionally brought the Cactus-feeding Coccus also In 1848 Dr Dempster addressed a letter to the Governor General of India which afterwards appeared in the Journal of the Agri -Horticultural Society He there extols the superior quality of the dye obtained from "the native" or "indigenous" insect as compared with the imported "The quality," he says, "of native Cochineal which I found capable of dyeing a certain weight of woollen cloth proves that the indigenous insects contain an amount of colouring matter not inferior to the fine Mexican cochineal" In the same year Or A Fleming published an account of the discovery of the Cochineal insect on the Cactus hedges near Gindrala in the Panjab He writes . "I got satisfactory proof that the Indian cochineal is an article of commerce in the country " In his Panjab Products Mr Baden Powell refers to an occasion when the Cactus had increased so rapidly in the Juliunder Doab "as to become a nuisance, and rewards were offered for its extermination which, however, were rendered unnecessary shortly after, as a large number of insects of some kind of Coccus appeared and soon effected the destruction of the plant, which is now only occasionally to be met with "

Mr Liotard (Memorandum on Dyes and Tans of Indea, enters into considerable detail regarding what he calls "the indigenous insect," and Mr. McOlelland says, "the insects seem to thrive on our own indigenous species of Opinita; but as we have abundance of the South American plant, O cohmilifera, that species may also be tried along with the several

sorts of our own "

In all these instances the Coccas alluded to is a cactus-leeding insect, but the lac insect, as stated above, belongs to the same genus and it feeds upon many widely different trees (see a further paragraph), but has never been recorded as feeding on the Cactus From the travels of Lieutenant Burnes and Dr Gerard (see Fournal, Asiatic Society, Bengal, II ) we learn that a species of what they are pleased to call Cochineal was seen to flourish on the roots of a plant growing in a marsh near Herat, but that the natives, instead of using that dye, are stated to import their cochineal from Bokhara and Yarkand Without speculating too far as to what the Herat cochineal may prove, when thoroughly investigated, it may be here remarked that the Polish cochineal (Coccas polonicas) feeds on the roots of a Scleranthus found in sandy places throughout Europe. Mr Baden Powell siludes to the Bokhara cochineal as imported into the Panjab. In numerous official and other publications, trans-Himála, an cochineal is referred to If this should prove distinct from the cactus-feeding species, it may be found allied to the Coccus slices of Greece, an insect which has long been used as a dye under the name of keemes chermes, or alkermes. That insect is reported to feed upon a species of oak. The Herat Coccus may, on the other hand, be alhed to the Coccus manuparus, Ehrenbergh, which is found in Sanai feeding on Tamarix, and is supposed to be the cause of the gum like exudation known as Manna

THE INTRODUCTION OF THE OPENTIA OR PRICELY-PEAR—The above remarks may be accepted as disposing of the question of "the indigenous cochineal insect which feeds on the common prickly-pear" If not indigenous then, as an acclimatised insect, has it deteriorated after

1460

coccus

cacti.

	CHCLL.
the lapse of 100 to 150 years? Perhaps the further question may also be suggested—was the insect derived from the best stock? If unfavourable answers have to be given to these enquires, then it would remain to be ascertained by actual experiment whether an improved and fresh stock could be acclimatised. We shall return to this point later on, but if may be the could be acclimated. We shall return to this point later on, but if may be the could be acclimated. We shall return to this point later on, but if may be the could be acclimated to the could be acclimated. We shall return to this point later on, but if may be accounted to the could be acclimated. We shall return to this point later on a strength of the could be acclimated to the could be acclimated to the could be acclimated. We shall return to this point later on a strength of the could be acclimated to the could be acclimated to the could be acclimated. We shall return to this point later on the could be acclimated to the could be acclimated to the could be acclimated.	Madras Cochineal Plant
truly mangemous, and may even be well worthy the attention of commer- cial experts. A scarlet dye is often alluded to in the ancient writings of	
	ı
of the first so-called Indian cochineal insects which were sent to Europe, and at the same time the head quarters of the acclimatised Quantias. The sudden appearance and disappearance of a Cocus in the Panjáb, mentioned by Mr. Baden Powell, would justify the conclusion that Captain Neilson's insect need not have taken more than a few years a company of the panjáb, insect need not have taken more than a few years a company of the panjáb produced in the pan	Panlab Cochineal Plant. 1402
r has spread in have become a the present cen- "This species of	
MODERN EFFORTS TO REINTRODUCE THE COCHINEL INSECT.  There are commercially two chief kinds of this insect, but whether distinct species, or the one only the wild form of the other does not appear to have been clearly made out. The former (the so-called wild insect)	1464

On the Strategy occursion

C. 1464

2 D

Grana sylvestria. A voluminous correspondence has ensued since 1705 as to the destrability of introducing the superior quality, which fetches (from its greater amount of the tinctorial principle) three times the price

coccus cactı.	Forms of Cochineal.
	paid for the wild insect As late as 1832, the Madras Govithis subject brought to its attention, and instructions were Dr George Bide, OIE, should supervise the experiment. Horticultural Society of Madras agreed to place at the disp

paid for the wild insect. As late as 1832, the Madras Government had this subject brought to its attention, and instructions were given that Dr. George Bidle, O.I.E., should supervise the experiment. The Agri-Horticultural Society of Madras agreed to place at the disposal of Government a small plot of ground for the purpose of this experiment, although that Society does not appear to entertain any high hopes of ultimate success. Dr. Bidle addressed two letters to the Government refuting the position taken up by the Society, and his opinions and recommendations were accepted by the Government.

FORMS OF COCHINEAL.

It seems probable that the insect alluded to by Dr. James Anderson as found in India prior to the arrival of the Rio Janeiro supply, was also the Grana sylvestris, hence possibly a certain amount of the confusion that has crept into the literature of this subject-that insect from its American name of "the wild insect" having come to be viewed as wild or indigenous in India There is no authentic information as to whether the Grana fina exists in this country, but it seems probable that the different qualities of the insects found may be due to the existence of breeds or races derived from both these stocks. The want of technical knowledge has prevented Indian unters, on this subject, from expressing a more definite opinion than that a superior or an inferior cochineal was found in certain districts This would seem to point to the desirability of having a representative series of the insects met with in India collected and scientifically and unctorially examined as the first step towards the establishment in India of a commercial industry Weread of numerous futile attempts to bring about this desired object but of no combined and systematic investigation As often happens with economic questions, the desirability of establishing a cochineal industry in India has been periodically brought to the attention of the Government, but allowed to lapse into mactivity from many causes, chiefly the transfer to scenes of greater usofulness of the officers who interested themselves in the subject Dalzell and Gibson, under the heading Opintia Toonah, Mil, say "This is a species on which according to Humboldt and Bonpland" the cich neal Grana fina is fed, others say that the false cochine at insect only feeds on trees. We have had numerous experiments regarding the introduction of this product. In the new-production-lever years, ranging from 1833 to 1845, sundry attempts were made by the late M Sundt and others, but after considerable expense incurred, and a heavy amount of correspondence, as usual in such cases, the whole ended in smoke" (Fl Bomb.

Grana Fina. 1465 Crana sylvostris. 1466

Supp. 400

Grave that and Grave sylvestris—Humboldt was, perhaps, the carl est observer to distinguish "the fine from the infective or wild not of cochineal." The former insect he says, is melly, or covered with a white proader, while the latter is enveloped in a thick cottony substance which prevents the rings of the insect being seen. The Grain fan is reported to be a native of Merco, and the Grain sylvestris of South America. De Ballour certarks—"It has been mentioned that at Virgingalam there is a great drail of the red flowering prickly pear on which it exists may resect feeds, that the insect under propagation at O moor (fingalize) here is certained to be the time or kineal inner, and to be the curable in several districts. South India, but it only destroys the plants with red flowers and the gracklys, and that it will not propagate or the very off were egget kny perior. And that the line provings can the very off were egget kny perior. And that it will not propagate or the very off the grackless, and that it will not propagate or the very off the grackless and the first practice for the first period of the first propagate of the very off the grackless and the future of the first period of the first propagate of the first period of the first period of the future in find it, it may be seed to the first point made by pre-first propagate or the many first period of the future in find it, it may be seed to the first period of the future in find it, it may be seed to the first period of the future in find it.

End flowered Openition 1467

1102

COCCUS

cacti.

## the true cochineal insect only destroys the prickly pear plant with red flowers and few prickles, and will not propagate on the yellow-flowered plant or Opuntia." Again, "as regards the Peninsular, we learn from Dr. Balfour that not only the variety (sic) of plant required but the superior species (no) of the insect also exists in parts of the Madras Presi-Although Dr. Balfour's remark as to the existence of the true cochineal insect in Madras has been thus reiterated by other writers, the Madras Government in 1882 decided to make an effort to introduce the agreed that Captain Neilson's insect, which was found to thrive best on the common Opuntia, was the Grana sylvestris and not the Grana fina Balfour be correct in the statement that the latter insect does actually exist in Madras, he may best on the red-flowered . lead to further confusion plant until it has been de on the red-flowered cactus is or is not a race derived from the true cochineal insect, perhaps more ancient than Qaptain Neilson's stock position assumed by Mr. Liotard of urging the extended cultivation of and not the semi-domesticated, has as yet been introduced into India, and that all the opinions he has quoted refer to the plant on which the former and not the latter is able to subsist. It would thus appear that the first and most natural step towards the introduction into India of a commercial industry in cochineal should be the thorough investigation of the races of coccus already existing in the country and the plants on which they feed Such an enquiry, as already suggested, might lead to the discovery of a race derived from the true cochineal insect, but so degenerated as to fully The plant on which the acclimajustify the importation of a new stock tised insect is found to feed would naturally be that which should be fostered in anticipation of the arrival of a fresh importation tion, if established, might be accounted for by an originally semi-domes ticated creature having been allowed to run wild for a century or more. or from having been forced to feed on the wrong plant. Mistakes may thus be made, but the course indicated would most probably prove the

which, under careful treatment, would prove more hopeful than any insect PECULIARITIES OF THE COCHINEAL INSECT. - This account of cochineal may therefore be concluded by referring to some of the more striking peculiarines of the insect which have a direct bearing on the question of its propagation Balfour says; "There are three periods of his of the

most direct, and it may happen that we possess a long-acclimatised stock

that might now be introduced.

2 D 2

selves to the cartus plant, and from that moment the fur.," her hold. A cottony cost grows over her, which fals or it 1, to a suny 1470

thereabouts, the sexes beec such the sexes beec a scarlet fly, with two trains body." "He is now after sunnise, but rarely takes to wind; he jumps and flutters about, and, having impregnated the female, eyes and mouth are quite sunk in ne and legs are almost covered by them, and are so wing into noundness. They appear generally eyes and mouth are quite sunk in ne and legs are almost covered by them, and are so wing into into into mouth are quite sunk in ne and legs are almost covered by them, and are so wing into into into into mes wellings about the insertions of their legs, that they can scarce more ithem, mutch less more themselves, and the insect to the casual observer looks more like a berry than an animal. When they are about three months old they begin to yield their young. In this state the may be detached from the plant is supposed she nitroduces into the imperceptible pores of the leaf she feeds on; and such is her excessive torpor, that once removed she will not attach herself again. After shedding the whole of her young, the mothet dies and become a mere shell, turning black. It is therefore at the time that the female commences to shed her young that measures are taken to remove the young to other cactus leaves. A nest is formed, in the shape of a sausage or purse, of young escape and spread themselves and day is found to be the best time and day is found to be the best time in the properties of th		
relaped in a cottony cylindrical purse, open at the bottony; the insection of the recombination of the combination of the combi		Propagation of the Cochineal Insect.
thereabouts, the sexes beec a scarlet fit, with two trained in body." "He is now a sarlet many, but rarely takes; "I summer, but rarely takes to the many in roundness. They appear generally the summer in roundness. They appear generally the sexes with the sexes when it is a summer in roundness. They appear generally the sexes and mouth are quite sunk in me and legs are almost covered by them, and are so we them sertions of their legs, that they can scarce more them, much less move themselves, and the insect to the casual observer looks more like a berry than an animal. When they are about three months old they begin to yield their young. In this state the may be detached from the plant She i tremity an amber-coloured liquid globul.  I moment of her fiving upon the plant, and san extremely fine probosons, which it is supposed she introduces into the imperceptible pores of the leaf she feeds on; and such is her excessive torpor, that once removed she will not attach herself again. After shedding the whole of her young, the mother dies and becomes a mere shell, turning black. It is therefore at the time that the female commences to shed her young that measures are taken to remove the young to other nesting.  Cochineral nesting.  I 473  Cochineral nesting.  I 473  Cochineral nesting.  I 474  Cochineral nesting.  I 475  Cochineral nesting.  I 476  Cochineral nesting.  I 477  Cochineral nesting.  I 477  Cochineral nesting.  I 478  Cochineral nesting.  I 479  Cochineral nesting.  I 479  Cochineral nesting.  I 470  Cochineral nesting.  I 471  Cochineral nesting.  I 473  Cochineral nesting.  I 473  Cochineral nesting.  I 474  Cochineral nesting.  I 475  Cochineral nesting.  I 476  Cochineral nesting.  I 477  Cochineral nesting.  I 478  Cochinera		"The male also adheres to the plant, and in about 12 days becomes en- acloped in a cottony cylindrical purse, open at the bottom; the meets
she loses her eyes and the form of her head, instead of a mouth she has an extremely fine probosons, which it is supposed she introduces into the imperceptible pores of the leaf she feeds on; and such is her excessive torpor, that once removed she will not attach herself again. After shedding the whole of her young, the mother dies and become a mere shell, turning black. It is therefore at the time that the female commences to shed ber young that measures are taken to remove the young to other cactus leaves. A nest is formed, in the shape of a sausage or purse, of fastened at the bottom of a leaf of young escape and spread themselves and day is found to be the best time. On this account nesting, ""The common belief is that the case. The young insetts, to be all connected one after they are in due time brought forth as living animals, after breaking the membrane in which they were at first probably contained as eggs, Being thus brought forth, they remain in a cluster under the mother's belly for two or three days, until desprayed from the umbhical cord. Every		they are the sexes beec a scarlet fly, with two trains a scarlet fly, with two trains a scarlet fly, with two trains body." "He is now after sunnied, but rarely takes to the wind; he jumps and flutters about, and, having impregnated the lemale, and it is to the same of the sunk in the most covered by them, and are so in a scarlet flegs are almost covered by them, and are so in the sexes and the insect to the casual observer looks more like a berry than an animal. When they are about three months old they begin to yield their young. In this state the may be detached from the plant She i
cochinest mother produces above a nuntrea young ones; but the mot- tality is great, and there or four mothers are required to cover one side of a cactus leaf with sufficient young for cultivation."	nesting.	she loses her eyes and the form of her head, instead of a mouth she has an extremely fine probosics, which it is supposed she introduces into the imperceptible pores of the leaf she feeds on; and such is her excessive torpor, that once removed she will not attach herself again. After shedding the whole of her young, the mother dies and becomer a mere shell, turning black. It is therefore at the time that the female commences to shed her young that measures are taken to remove the young to other cactus feaves. A nest is formed, in the shape of a sausage or purse, of fastened at the bottom of a leaf of young escape and spread themselves and day is found to be the best time that the fease. The young inserts, to be all connected one after a placenta, and in this order they are in due time brought forth as living animals, after breaking the membrane in which they were at first probably contained as eggs. Being thus brought forth, they remain in a cluster under the mother's belly for two or three days, until disengaged from the umbitcal cord. Every cochineal mother produces above a hundred young ones; but the mortality is great, and there or four mothers are required to cover one side
PROPAGATION.  In an interesting pamphlet written by I. S. C. D. and published by the Government, much useful information has been brought together regarding the various systems pursued in America and other countries	X474	PROPAGATION.  In an interesting pamphlet written by I. S. C. D, and published by the Government, much useful information has been brought together

In an interesting pamphlet written by I. S. C. D, and published by the Government, much useful information has been brought together regarding the various systems pursued in America and other countries in the propagation both of the insect and the plant. We cannot afford space to deal with this subject, and must accept the above abstract of the

#### The Cochineal Dye.

COCCUS cacti.

life-history of the insect as indicating the great governing factors with regard to the insect, and refer the reader to Opuntia Dillenil in another volume for the more important facts regarding the plant The following abstract from the above pamphlet may, however, be found useful. "The proper manner of gathering varies according to the object to which the plants are devoted, but, as a general rule, the leaves on which the bags are placed are sharply cut off with a kmfe, close to the branches, and the cochineal is swept off them into broad baskets closely woven to prevent loss."

"After the leaves are all cut off and swept, they are dropped into the ridges, where they are left, another set of gatherers carefully scrape off the insects which have passed into the branches or trunk of the plant, since leaving only one or two of these insects on the branches is fatal to the health of the plant." "The cactus cannot bear much water when not strengthened with manure." "When a plantation is reserved for the production of a winter crop, the leaves should be covered with cochineal in the month of October or November, by planting the young cochi- Propagation, neal at this season it ripens, and is ready for gathering at the latter end of February or of March Another part of the plantation is reserved for receiving the seed at this season; but as the plants cannot be forced to bud during the winter, the seed must be planted in March upon last year's leaves, which have the disadvantage of being tough for the insect, and this renders a winter crop more precarious than one obtained in summer." Wind and rain are very destructive: hence a region with a pronounced rainy season would either be unsuitable or the seed-stock at least

Collection. 1475

1476

Suitable Climate 3477

COCHINPAL DYE.

Mr. Wardle, in his recent Report on the Dyes of India, mentions experiments performed by him with several samples. Of a Hyderabad sample he says, it "appears to be very good" "The Government report, in which reference is made to it, is by Major W Tweedie" "It would be interesting to ascertain whether the cochine is produced in the Hi, derabid Residency, or is imported from South America." Of

Treatment of 1478

DYE 1479

sists of insects matted together by some dark-coloured substance Both samples small and poor." Reference has already been made to Dr. Dempster's report on cochineal from the lower North-Western Hima-He says. "It is beyond all doubt a true Coccus carti; and although it will probably turn out to be a distinct and separate species, it agrees very closely with the description given of the woodland or wild cochineal of Mexico" It may be observed that the word "true," used in the first clause of the sentence, somewhat contradicts the concluding words, and further, that the "wild cochineal" is not the Mexican insect Dempster continues "In the month of December the young brood were extremely numerous, very lively, and ready to leave the mother and spread themselves over the plant. Sulphate of alumina, added to an alkaline solution of the colouring matter of the native (sie) cochineal,

## The Continue they.

carti.

1100

throw of new ment one elegant of which, where collected and its mil, tempore eret a fale organianter ere fache pringing in falend and in & unemarine i unterare " " Me waper amounts in elyning wis lien of als with last sa e which president arman minute and mail to another property of property of property and It is not the formular samply with in the open moderning as solely the in Mercano track and for the formular samply and the said growns or live not meeting, and produced that which the hand sample of good in the linear to the host that which is the formular sample of good in the linear to the first that the produced is said to track to the host that produced is said to track to the host of good in the linear said to the first that the produced in the linear said in the linear said that the first that the produced in the linear said that the linear s from 20 to me the mobile the private which is go to be a from the mility Price destructed Right point, "De Domptor give on to say the com-ported end mealing and by the Lind wish Kashmeeshawl dyers, but that the arrest ofta and fixely was enjoyened. Healtes "The grant sy of rest av e a h nestan i h ff miniteapit to philas no a critis municht if windlen eboby present it it the feet gen ing feiente einen ein am ammittet enfouring matter r t inferior to the fee Mescan such nest". The etatement is en completely at variance with the opinions of all teles flarogram we tree. that the inference is unavoidable that the imported due with which De. Dempster compared the bustarted water t Ster cancer binest. The Thetreatment that the inner eltained in the Panille was the encalled "wild erch craft or Grana extrestrie, an inject which affords only one third the amount of die to be ed to not from the Mexican or Grava Bea. imported civilineal experimented with by Dr. Dempater may even have tern the fle ht ara crechineal, large quant ties of which fact their was into the l'anjth and to Homes Dr. A. Fleming's account of l'anjth each . neal has also been incutentally alluded to, but a further passage may be bere estracted from that observer's reports. "All the realistics and fields in this village are lined with magnificent specimens of the eactus, for superior to any I have seen since I left Ludanah, and their leaves are

1481

this description there is little room for doubt that the cochineal insect seen by Dr. Fleming was the Grana sylvestris. PRINCIPLE OF THE DYE .- The colouring matter of cochineal, as of lac. is derived solely from the female insect, and is produced only at the period appre sects, dead and dried, deteriorated. lue of which is Rr and make up one 12 ann 15." 70,000 are required for that weight. These two figures are almost alternately given by different writers-a fact which may be accounted for by the larger or smaller size

covered with the evaluated insect, which, it strikes me, attains here, protably from good feeding, a larger size than I have ever seen it do before. As I passed these hedges of the prackly pear, numerous Kashmins were scraping the exchineal with a blunt iron instrument from the surface of the leaves into a basker such as the natives use for winnowing corn asking them what they were collecting this for, they told me it was to sell to the American dyers, who give them one rupee for the angrass (English) ser (21b) of the substance when dry. In order to dry it, they rub the cottons matter and the insect into balls of a soft consistence, and then dry this in the sun on a sirky mat. By this process the insects are squeezed, and their colouring matter absorbed by their cottony envelope."

1482

of the different breeds of insects. APPLICATION OF THE DYF .- Professor Hummel says: "It is little Formerly much emely replaced by the use the introduction of the

ited." "Two different ly, a bluish red, called

## Cochineal as a Medicine.

COCCUS cacti. Wool dveing. 1483

crimson, and a yellowish or fiery red, called scarlet." Hool mordanted with 2 per cent. of bichromate of potash and died in a separate bath recence a good purple, the colour being darkened by the addition of sulphurse acid to the mordant. Mr. Hummel gives particulars of the dyeing for crimson or scarlet. Wool to be dyed the former colour is mordanted with aluminum sulphate and partar, the dyeing being effected There are other methods, but the above is perhaps in a separate bath the best Lime salts are not beneficial. The latter shade is produced by the acid of stannous salt and cream of threar or exalic acid mordanting may be performed separately or along with the cochineal

Silk d_{veing} For silk the mordant is alum, to be worked into the fabric for half an hour and steeped overnight. The fabric is then washed and dried and died in a separate bath. This gives the crimson. For the scarlet, after boiling and washing, the silk is first grounded with a light yellow produced with soap and arnatto and thereafter washed. For darker shades soan In both cases the fabric should be mordanted by should not be used the same process as described or the crimson, only using nitro-muriate of tin in place of alum. By the aid of iron mordants fine shades of blac mas

be obtained In a recent report on the pigments used in the North-West Provinces the following particulars are given regarding cochineal. One part of cream of tartar to 30 of alum and four parts of cochineal are used

Plaments. 1485

I484

## COCHINFAL AS A MEDICINE.

Medicine.—Cochineal is used mainly as an agent for colouring drugs. but it is supposed by some to possess anti-spasmodic and anodyne properties.

Chemical Composition -As far as has been determined, cochineal and CHEMISTRY. fac owe their finctorial properties to an acid apparently identical in charac-

MEDICINE. 1486

carmine, a nitrogenous compound which they expressed by the formula C₄H_BNO₄. Subsequent observers (Arppe, Warren de la Rue, Hugo Muller, &c ) showed it to be an acid, and found that, in a perfectly pure state, it does not contain nitrogen, though accompanied by nitrogenous matter which it is difficult to separate from it. John named the colour-ing principle cochinilin. The acid of the authors named has been expressed as C1H1O, but the crystalline carminic acid isolated by Dr. Schützenberger

by Dr. Schaller H.O. (Crookes) aqueous extract cipitate with sul-

precipitated, and the precipitate decomposed, a second and a third time in a similar manner, employing, however, hydric sulphide to effect the final decomposition. The filtered solution is evaporated to drvness, the residue dissolved in alcohol, and the crystalline nodules of carminic acid !

COCK UT

#### Tette fo Corb mer.

* F t Propriete at the was existe specification and The Kan are of Elane of Eller . The last a set a member "E at bin the ft were of Mineste it torice a rifer fiebly and met are The new to be the so green the fair term of which while profit in the so we so the so the so the first for the first first for the south of the south first first for the south of the south of the south first first for the south of the sout want at a se was an ametical teletion colors who a worm makes. I mish a he extend of whene to the a gate many ne the act make be ar' IV gargiere to etra ant to no bate greet and in gib e and pensone the smeather web as one we granter a chiter of Alette, which en Birl "E et gic te m girt ef the gamen in et ant giel? the remain torte age mant me quageraten. The wa ery of e en effe affineat partie wat to er " I't is a what ratings a net by acres and if remed by a crear The er to a long matter both that the easy aret. The estaclifice both and be the provider a Clarific part, and there exist in a clark guiple age. greated not to black. The est set and reque at yething materialitely to free proses the encloseing matrix of a television wind in with aliming at the matter promote known a last. The promote he were an commenta-tion of menting the sectional the west money young a year given had er ta an mat getat ne. Attenden nit ear ea prei gi ite in the a prei it reducers until a command make more all it when earn on him to be thrown stown. Neutral affect on est atom common a alto est towh in the soul eate of alkates (t cartests of press), the example) and other shall more et an eraper

The chemical history of the generators is, however, incomplete. The abadieness are are solubly, the of the sa, a far as has been ascertained, are arresphous substances. The off ferret termins beared with each next in let the influence of chemical reagents is due to the presence of miscogen, but as indicated, as a princed rule, adids turn the action to yellowish red, overfic and producing the best result, while the abadies turn it to violets.

1483

bines with the elements of ammonia, thereby forming an amide acid.

1 total and Comments

1480

#### TRADE IN COCHINFAL.

The Madras Government exported, in September 1707, 21,744%. From the reports of the sales of Indian Cochineal during the years - 55,100% were sold at an average of the more than the prime cost. The d in 1807 that during the past seven

England, but that from the London price-current cochineal was not an article of profit to the Company.

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The Lac Insect.	coccu lacca
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	1490
writer was informed by a merchant that so completely had the lac-dye trade been destroyed by aniline that a large quantity of lac-dye was recently thrown into the Thames as worthless and unsaleable. (For the trade in lac-dye see a further page)	
Coccus lacca, Kerr.	1491
THE LAC INSECT, Eng.; LAQUE, Fr.; LACK, Germ; LACCA, It.	1
Vern Lakh, HIND , Gald, BENG , Lakshd, SANS.	
: ' ' —T' ' ' ' ' ' - ' f Indu, and occurs s, especially Butea y a complete list of	
the plants on which it feeds, see below.	}
Description and Mode of Growth —Lac is the resinous incrustration formed on the bark of the twigs, through the action of the lac meset. When the larvae or grubs of the Coccus facca escape from their eggs they crawl about in search of fresh sappy twigs. When satisfied, they become fixed and form a sort of cocoon by excreting a resinous substance. The male ecocoon is own an shape, the female circular. For about ½ months the insects remain within their cocoons in the lethargic state, but structural changes have been accomplished by which they have reached the mature or imago condition. The male escapes from the cocoon by bricking out at the ventral opening. The female has also become mature, but since it is destined to remain in its present position, it renews activity mentions to be a substance of the cocoon by the circular body of the female there are three openings, which become developed, as the incrusiation proceeds, into three filamentous tubes. One serves the purpose of an anal opening, and through it impregnation is also accomplished, the others are breathing stomata. When the male escapes from the cocoon, it at once commences to crawl over the females. The impregnated femile, after depositing her eggs below her body, commences to construct cells round each with as much precision as the bee forms its comb.  The irrition caused by parasition issets on vegetable itsues results in the formation of many curious, and extraordinary structures, some of which are economically of great use to min, such as gall-just, lac, &c. In the case of the lacinsect, the plants chosen are those naturally possessed of resinous sap, changing its properties entirely. The Coccus lacca penetrites the bark of the twig by its probosts or penetrator until it reaches the structure.	}

siderably and becomes brilliantly coloured. The red colour is due to the formation of a substance intended as food for the offspring. The eggs germinate below, and the livrue, eating their way through the body of the mother, make their escape to repeat this strange history.

lacca.	Trees on which the Lac Insect feeds.
1493	TREES ON WHICH THE LAC INSECT IS REPORTED TO FEED
	I Acacia arabica, Willd (LEGUSINOSE) The Babul or Kikar (Gamble,
	(51) "In Sind and Guzerat yields large quantities of lac."
	2 Acatia Catechu, Willd (Leguminosa)
	3. Albizzia lucida, Benth (Lrouminosm). Silkori, Brno
	4. Aleatites moluccana, Willd (EUPHORBIAGE) The Akrol of the pluns, introduced from Malay, now almost wild, especially in South India
	5 Augus squamosa, Linn. (Anonance n.) The Ata, a tree introduced from the West Indies
j	6. Butea frondosa, Rord (LEOUMINOSE) The Dhak or Palas
1	7 Butea superha, Roxh (Leouminosæ). A climber, scarcely distinguishable from the tree B frondosa, except by its habit.
	8 Carissa Carandas, Linn (APOCYNACPE) Var. spinarum, sp. A DC
	9 Celtis Roxburghli, Bedd. (URTICACEE) Eastern Bengal, Central and South India
	to Ceratonia Siliqua, Linn (Leguninosm) The Carob Tree; now almost naturalised in the Panjáb and South India.
	tr. Croton Draco, Schleck (Eurhorbiagen)
	12 Dalbergia latifolia, Roxb (L. FOUMINOSE)
	13 Dalbergia paniculata, Roxb (LEGUMINOSÆ)
	14 Dichrostachya cinerea, W & A (Leguminos M) The Vertuli, a shrub of Central and South India
	15 Dollchandrone Rheedu, Seem (BIGNONIACRE) A small tree of Burma and the Andaman Islands
	16 Enolæna Hookenana, W & A (STRECULIACEE)
	27 Erythuna Indica, Linn (I govinosz)
1	18 Feronia Elephantum, Correa (RUTACEE)
1	19 Ficus bengalensis, Linn (URTICACEE) 20 Ficus comosa, Roxb , in Assam
1	21 Figus cordifolia, Roxb (Gamble 335) Assam Lac
j	22 Ficus elastica, Bl The India rubber Tree (the Bar)
i	23 Ficus glomerata, Roxb
	24 Figns infectoria, Willd The Pakar or Keol.
- 1	25. Ficus laculera, Rord (URTICACER) A native of Sylhet, the Ruthal But
1	26. Ficus religiosa, Linn The Aswat or Pipal
1	27 Garaga pinnata, Roxb (Burserace E) The Garaga or Kaikar
1	as Kydia calycina, Roxb (Malvacem) A small tree the Pola
- 1	20 Lagerstrom a parvifora, Hook f. (LYTHRACEE) The Bakls or Sils
	30 Mangifera indica, Linn (Anacardiaceæ) The Mango, in its wild state, often yields lac.
	31 Nephelium Litchil, Camb (Sapindace # The Lichi
1	32 Ougeinia dalbergroides, Benth (I rouminosm) The Sandan
š	33 Prosopis spicigera, Lain (Leguminos.E). The Jhand of the and zones of the Panjab and Guzerat
ì	Pterocarpus Marsupium Roxb (Leguninosm) The Bija or Kino tree, a native of Central and South India
	35. Pithecolobium dulce, Benth (Leguminosæ) The Dakhuni babul, a tree introduced from Mexico
î	36 Schima crenata, Korth (Terretræmiaceæ) An evergreen tree of Burma
	C. 1493

Products of India.	41
Uses of Lac.	coccus lacca.
37. (***) The Kunner of Kunumb.  38. (***) The Sundament of the state	ł
PROPERTIES AND USES OF LAC.	ì
After the moved and cut up into the first are spread upon a fl thick the resinous crust is fully removed, and the resinous fully removed, and the resin thrown into tubs of water, where it is either beater with awooden	Stick lac. 1491
pestle or trodden under foot. The liquid becomes red coloured, and one	Inc-dyo. I495
tics, and now  seed-lac of con feet long and	Seed-lac. 1495

seed-lae of con feet long and	··		. '	•	Seed-lac. 1495
					.1
1				lac is force	Shell-lac. 1497
	:: :	• ':	• •	These a	re Sheet-lag.

es known in lly with the coarser qualities used for home consumption, the melted lac is let drop into rounded pieces about 1 to 11 inches in diameter. These constitute button-

lac, and if formed into larger masses, sheet or piece lac.

Qualities and Prices of Lac.—The quality of lac varies chiefly according to the lack of th

The other qualities are known as 1503 Native-leaf. num price £8.9 per cwt.; "garnet" nd "button" being generally about

£3-6 or £3-8 per cwt The best lac comes from Siam. ADULTPRATION OF LAC.—Lac is frequently adulterated with orpiment, or still more frequently with common resin, which may be detected by its

Adulterated Lac 1505

Button-lac.

1499 D C 1500 ISOI Orange. I502 Garnet.

**I504** 

		2,7,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	
COCIILOSI Gossyi		ger Walte Sitk-Cotton Tree.	
Varnish. 1505 Baiti. 1507 Scaling-wax. 1508 Eement. 1509	tean which he believed the lac which they and tion condemned strong that coun was an order	c. The writer was ence informed by a usual coarse of buttness imported was used up by the nature devices in another merchants expected. The gentlem y the pro-set of adulter titlen, but favored to trade used for other purposes would only be more largely in a part of the coarse of adulter of the coarse of a purpose the purpose would only be more largely in the coarse of the coars	ers large dalterate un in que e remarke enes who
Dye. 1510	** ' * "	Lac Dyr.	ولميزدمال
1511	in Bengal, and Sir E. O in Bengal, and Sir E. O information regarding the existence of the ri- lacis not so easily work we have already discus- slight modifications to 1 properties of both dyes, brol  speaking, it will not now as a by-product in the	s u sino d a	ble with of the
	COCHLOSPE	MUM, Kunth.; Gen. Pl., I., 124, 9	71.
1512	Cochlospermum Gos	sypium, <i>DC.; Fl. Br. Ind., I., 189</i> ; B	lixineæ.

SCHETIMES CALLED WHITE SILK-COTTON TREE. C. 1512

White Silk-Cotton Tree.

COCHLOSPERMUM Gossypium.

Syn.—Bombax Gossyrium, Linn; Roxb, Fl Ind, Ed, C. B. C, 515.

Vern.—Kumbi, gabdi, ganiár, galgal, gangal, Hind; Hope, Santali; Gulgal, hoi; Gangam, Gong, Kontopalis, Uniya, Kumbi, Ph.

For the Gum.—Moodeen Sheriff gues the following Nat ká katérá, nát ká-katérá gónd, Dec., Hindi-katérá, Hindi; Tanaku pishin, TAM.; Konda gógu-banka, konda gogu-pisunu, Tel.; Shima-pangi pasha, Mat.

For the Cotton.—Pils kapás ki-rás, katéré ké jhár-kí rái, Dec; Tanaku-parutti, Tam, Konda gógu-patti, Tel, Shima pangi parutti, Mal. References.—Brandis, For Fl. 17, Gamble, Man Timb, 17, Dymock,

Part I, 18, also Him. Dist., 733, 783, Cooke, Gums and Gum-reins, &c., 20, Drury, U. P., 145; Murray, Pl. and Drugs, Sind, 47, Forest Ad. Kep, Chuita Nagpur, 1885, p. 28.

gro Sut

tl garant

Deccan, also in the Prome district of Burma. Commonly planted near temples When the tree is devoid of leaves (in March to April) it bursts into its handsome large yellow flowers, its pendulous, pear-shaped fruits ripening before the new leaves appear.

Gum—This is often sold in the bazaars of India as katira or kathira (the Persian and Arabic for Tragacanth), that name having been given to the gum of this tree by the early Muhammadan settlers in India.

GUM ISI3

doubtless be employed to impart a polish to tasar silk.

Stewart remarks "The kátíra, of which to maunds are stated by Davies' Trade Reports to be imported annually via Peshawar, must be entered by mistake, or be the product of a different plant" [Obubless the true kátíra or Tragacanth—E2] "And, oddly enough, the same authority gives 50 maunds of this substance as exported from Ludhana

011<u>.</u> 1516 flors being viewed as possessing the merit of elasticity—a merit which might allow of its competing favourably with the true kapok.

Oil.—The Rev. A. Campbell, Santal Misson, Chuid Nague, describes a bright red oil which by hot expression he extracted in abundance from the seeds. He adds, although this property of the seeds is well known to the Santals, they never extract the oil. Oooke in his Oil and Oil-seeds allocating an oil, nothing further is known. Samples of the oil were shown at the late Colonial and Indian Exhibition and these are now deposited in the Kew Museum. Were a use to be found for the oil it.

MEDICINE. 1517 Floss. 1518 Medicine.—The gum has the properties in a mild degree of Tragacanth, for which it is proposed by Moodeen Sheriff and others as a substitute. It is also used as a mild demukent in coughs. The floss has been recommended as admirably suited for padding bandages, splints, &c., being soft and cool. On this account it has been suggested as suitable for pillous and custions used in hospitals, &c. Irvine (Mat. Mad., Patina, p. 78) says the druel leaves and flowers are used as stimu-

lants.

Structure of the Wood—Extremely soft, grey, but has no heart-wood, and is not apparently put to any useful purpose; weight 17th per cubic

1519

Cockles, see Molluscs (edible).

Coco or Cocoa, see Cocos nucifera; Coca, see Erythroxylon and Cocoa Nibs, see Theobroma.

C. 1519

foot.

1520

cocos The Corns out Palm. nucifera.

# COCOS, Linn ; Gen. Pl., III, 045.

Cocos nucifera, Linn ; Brandis, For. F7, 556; PALME.

THE COCOA-NUT PALM; THE COIR OF COCOA-NUT FIBER; PORCUPINE WOOD; COCOSER, Fr.; COCOSNESS, KAIR,

Vetn.—Narel, nényal, nériel, nériel, nényal kajér, llind ; Nériel, nényal, dib, naralel, llend ; Narel, nenyal, adi, naralel, llend ; Narel, nenyala, néren, nélyer, nérend mér, narel, llend ; Narel, nérala, néralad, nél, méd, méd, makal, varela, narel, neral, hond ; Narel, nérala, narel, nérala, narel, nérala, narel, narel, neral-cha jhada, narel, mar, tenpinmar (the puce yeld ing form in hanara), Mar, Narel kipér, nárel Dux Jenna, tenga, tennan-ched, tenna maram, ténga, tenga, Taw , Narel, adam, ten kas, kobar, gobart land, ten kaya, telba chall, koban chetta, tenas, tenas, pobart land, tenas, tenas, along challa, land, pobart, narel, nenas, along challa, land, pobart, land, tenas, tenas, tenas, along challa, land, pobart, land, tenas, te kota, kobbart, goburri kora, sen kuyu, averi cantille, Thenpinna, kin-kasa chettu, erra-bondala, gujju-narekadam, Tet., Thenpinna, kin-

badini (naryible in Ainshe), Pens.; Pol, pol gass, pol gabi, pol namaii. tambili, Sing ; Ong, ung, ung-bin, on, onsi, onti, ondi, BLRH ; halafa,

DRY LERNEL, COPRA (KOPRA) or COPPERAH-

Akofra, Hind ; Akofra, Guj ; Akofra, Ekipet Hibatti, Dlk ; Kollarait tingen, Tam ; Kobbero, kolbera tinkeya, Tel.; Koffara, Mala ; Ko-bari, kolbari, Kan

OIL, COCOA NUT OIL-

(L. COCKA WIT Unerpolitabett, northabett), time, Dix a Michildent, when the IRMS 1. Northabett, divident at IRMS 1. Northabett, divident at IRMS 1. Northabett, divident at IRMS 1. Tingdynner, targes weep, tengdispense, tall for the IRMS 1. Tingdynner, targes weep, tengdispense, tenddispense, tenddispense, tengdispense, tally the IRMS 1. Tengdynner, munch tally, minnhense, war-minah, balambe, balafa weinah, MAAA J Tengdynner, colort, A.M. J. Karielet acidam, K.M. J. Domannaryt, discontinguese, and the IRMS 1. Tingdynner, colort, A.M. J. Karielet acidam, K.M. J. Domannaryt, discontinguese, and the IRMS 1. Tingdynner, colort, A.M. J. Karielet acidam, K.M. J. Domannaryt, discontinguese, and the IRMS 1. Tingdynner, and the IR (jows-hind in Ainsie), Arab.; Aighane nérgil, richane-béndinj, Pers ; I ol tel, Sing ; On si, Burn.; Cay-dua, Cochin-Chinese

belnir-ta-tani, DLX ; bella ner, TAN ; bella ners, TEL.

Navili, Und ; Navil ki séndi, navi lie, Dix ; Tengé kallu, fennan-kallu, fennang-lalio Tam , Tenbara kallu, tenkala, Tau ; Navgi se, navgili, Naba i Tengyenasgil, Prad.

FIREE-Cor! (See first paragraph of chapter on Cou), Hixo ; Tennam mar, Tam ; Tenkaid mar, Tat.

COCOMMET CARRACE-

Tennam kurtu Tan ; Tenlaia guetu, Tel.; Karu-la lente, Aran

CETTON OF TORERTS M. Jenna maruttá fungue, Tan ; Jenleinecke afath e, Tel.; Jennamtoffe, MAL.

COCOS nucifera.

The Coces not Palm.

Habitat -A pinnate-leaved palm, with a strught or often gracefully curved stem, marked by annular scars, cultivated throughout tropical India and Burma especially near the sea-coast. On the eastern and western coasts it is particuarly abundant, more so towards the south several cultivated varieties but all flower in the hot season, the nuts ripen ing from September to November Dr Shortt states that in South India the paim thrives at altitudes up to 3,000 feet above the sea, and he even mentions one on the Shevaroy Hills at 4,500 feet Cocoa nuts are abund-

Indian Region. 1521

ant in Brigalore up to 3 000 feet
Starting from the Bry of Bengal, the cocoa-nut palm follows the Gangetic basin inland for about 150 to 200 miles, from the western coast its cultivated distribution inland is much more limited, and in Koluba, for example, is little more than half a mile from the beach. In very exceptional circumstances, or under the most careful garden cultivation, it may be seen further inland in Bengal than stated, and it even occurs in some parts of Assam It is, however, essentially a plant of the coast, and luxuriates on the islands of the Indian Ocean The Indian region of the cocoa nut may thus be said to be the lower basins of the Ganges and the Brahmaputra, and the Malabar and Coromandel coasts In the Brahmaputra valley it ascends to a greater distance from the sea than in the Gangetic, but in both it is an introduced tree, as it nowhere occurs in forests far away from human dwellings On the Malabar coast, and on the islands off the coast of India, it may be different, but even in these localities it rarely exists as a forest tree, although it is self soun. It is abundant on the Laccadive Islands, and on the Nicobar group in the Bry of Bengal, but excepting the recent efforts at cultivation, it was formerly rarely met with on the Andaman Islands, which are only 72 miles to the north. It re-appears again, however, abundantly on the Cocos Islands, a small group lying some 30 to 40 miles still further north (where it is in no way cultivated) M DeCandolle states briefly the arguments in favour of an American as well as those of an Asiatic origin for this tree, and concludes by expressing the opinion that it most probably belongs to the "Indian Archipelago" Its introduction into Ceylon, India, and China, he states, does not date further back than three thousand years, "but the transport by sea to the coasts of America and Africa took place perhaps in a more remote epo h, although posterior to those epochs when the

The Cocoa-nut Palm.	cocos nucifera-
geographical and physical conditions were different from those of our day,"	
CULTIVATION OF THE COCOA-NUT.	CULTIVA-
It is commonly reported that there are in India 480,000 acres under	
the cocoa-nut. A number of passages from Indian authors will be found scattered through the present account of the palm, which every now and again recur to the question of its cultivation. It may, however, be describle to give here a biref abstract of the opinions published by the better known European writers, since from these may be gathered the results of scientific experiments.	-
of scientific experiments.  Sow 186.—Righ entits, carefully collected, should alone be employed as seed, and for this purpose they are usually gathered from February to May. Seed from very young or very old trees should be avoided. After having been kept for a month to six weeks they should be planted. This may take place in January to April, or again in August, provided the rains are not heavy. The seed-beds should be dug 2 feet deep and the nuts planted 1 foot apart. The nuts should be laid on their sides, leaving 2 inches of their surface exposed. Ashes, or ashes and salt, should be freely placed in the trenches; these act both as a manure and as a preventative against insects. The seed-bed thus prepared should be kept moist, but not soaked. The germinated seeds may be transplanted when they are in their second to their sixth or even twelfith month. In the Godavan district they are placed in their premanent positions when three to four years old. In damp localities the transplanting may be done in the hot season, otherwise during the rains.	50wing. 1522
TRANSPLANTING —The seedlings should now be put out in the plan- In prich soils the 2 or 3 feet deep. In marshy land, recommended to	Transplant- ing. 1523
be freely mixed with the prepared soil to be put into the pits, as this is sup-	

posed to prevent the attacks of the beetles that prove so destructive to the trees. Cultivation of turmeric, arrowroot, &c, in the pits, along with the cocoa-nuts is believed to be beneficial. The soil round the seedlings is also often kept damp by a bed of leaves, particularly such as will not en-

> reatment Plantation.

**I524** 

should be opened out and manured about the commencement of the s: it The t to 2 feet above the ground, but in exceptionally favourable climates and soils it may be those or found one that he are The Earth and a soils it may be those or found one that he are do not form fruit four more years t soils and if water poor soils and if i or not till the te set, and by the end of the year they are fully ripe. Cocon-nut pulms may be easily transplanted, and indeed often with

advantage. Some of the fibrous roots should be cut away, and manure, 2 E

COCOS The Cocos-out Palor nuclfera. CUITIVAtopether with a little salt, placed in the pit in which it is intended to plant TION the tree. Yleid Vietn-As a rule a cremment throws not a spathe and a leaf every 1525 month; each flowering spike yields from to to 25 nuts. The produce of a free in full health and properly tended may be from 50 to 120 and even 200 nuts a year, the yield depending greatly, of course, on the suitability of the climite and soil for cocon-nut cultivation, a safe average would be 100 nuts a year to each tree in full bearing. The cocoa nut will continue to bear for 70 to 80 seres. CULTIVATED FORMS 1526 There are five recognisable varieties of the cocoa-nut met with in Ceylon. These have been described as, set, the Tembels, a plant with an aval-shaped nut of a bright orange colour, and, a more spherical form, and, a heartshaped fruit of a pale yellow colour, with an edible inner rind, which turns red when the outer skin is removed, 4th, the ordinary form, 5th a small nut about the size of a turkey's egg. This fast form is rare but much admired Boon (Engris, 1353) says "there are some 30 varieties of eccoa-nut distinguished by the natives of the districts producing them, but many of these distinctions are obviously groundless" Repeated reference will be found throughout this article to the different forms which occur in India, but of these, with perhaps the exception of that met with in the Laceadives, scarcely any deserve special mention. The I accadive smallfruited form, with a soft, fine, but strong coir, seems well worthy of special consideration where the object of cultivation is the production of fibre Or Shortt says there are 30 different forms in Travancore "The largest variety of cocoa-nut that I have seen and examined comes from Ceylon. I have occasionally seen specimens nearly as large from the Coromandel coast. There is a small dwarf variet, which fruits while it is about 2 feet high, the plant continues to grow and with age attains to a height of from 10 to 15 feet." A small form 15 met with in East Dwarf Cocoanut. 1527 Africa that does not possess the fibrous pericarp—(see concluding sentence of chapter on medicinal properties, page 448) In Indian newspapers announcements of branched cocoa-nuts occasionally appear, as also of branched date-paims These are viewed with superstitious horror by the They are most probably the result of two plants growing together, or of two or more embryos in one nut Soil -The cocoa-nut "thrives best in low, sandy situations, within the influence of the sea breeze, and never attains the same perfection when grown inland." (Stant' Ferryl.) Summonds writes "Soils suitable Soll grown inland" (Spons' Encycl) Simmonds writes "Soils suitable for a cocoa-nut plantation are variously described as below, particularly 1528 observing that stony grounds, or those overlying rocky foundations, are to be avoided .--" I. Soils mixed with sand, either dark-coloured or river-washed. "2 Where sand is mixed with clay, ierruginous earth, or black mould. "3 Clayey soils where the under-strata consist of sand

Sand and clay, even when mixed with gravel and pebbles

The sea-shore banks of backwaters, rivers, tanks, and paddy-fields. "6 Alluvium of rivers and backwaters, provided a yard and a half of land is to be generally seen above water level

"7. Marshy land even in brackish soils (but not where salt is formed in

crystals by evaporation) "8 All level lands exposed to the sea breeze where the soil is good, as the valleys between hills, tanks, and ditches which have been

filled up "g Lastly, even the floors of ruined houses well worked up, and any places much frequented by cattle and human beings on account

#### The Cocoa ant Palm

COCOS nucifera cultiva-

of the ashes and salts of ammonia from the urine, Ac, deposited day by day in the soil,"

Simmonds further sixs "The nuts for seed should not, on being gubered, be allowed to fall to the curth, but be lowered in a basket or ristened to a rope If let fall, the polished cover to the fibres will be injured and collect damp about the nut, or the shell inside may be cracked and the water disturbed. These are I tall injuries, or even if the plants still grow, they will, on being trinsplanted, not make fresh shoots, but produce weak trees having their fronds constantly drying up, nuts tarely matured, and often are even without kernel in those which appear perfect. If the nuts are allowed to dry on the tree before gathering, the plants are lable to be loss, not lawing water inside to cherish the growth of the smout (before the actual roots shoot into the soil)"

"Nurseries should be somewhat exposed to the influence of the sun, though not too much heat plants thus grown will even, though deficient in stature, be strong, and when transplanted will not fail, nor suffer from heat. The planting of the muts should take pince in January to April, and also in August provided the cains are not heavy, and then the plantier may expect intuifal trees to be produced when grown, but nurseries formed during the heavy monsoon will generally fail, or produce trees which will yield small nuts. Too much moisture of every kind is impurious to the plants." Speaking of soils Dr. Shoritsays. "The cocoa nut requires alluvial and learns soil for its successful growth, but any soil with a free mixture of sand and city answers furly well. Sex-sand where procurable is recommended to be thrown into the pits when the earth is being returned around the plants. Half sand half earth is considered the best material to fill up the pits with."

m ap the pies and

#### PECLEMENTIES OF INDIAS CULTIVATION

The following passages from the Gazetteers will be found instructive and of value to intending cultivators as having a special bearing on India

I In Bombay (Kolabi District) - Of the liquor yielding trees of this dis-t the cocoa palm is the most important. The moist climate, sand, trict the cocoa palm is the most important soil, brackish water, and abundance of fish manute, make its growth so vigorous that the yield of juice is much in excess of the wants of the distruct The trees are grown within walled in or hedged enclosures, sometimes entirely given to cocor nut palms, in other cases partly planted with mangoes jack betel nut and other fruit trees Every garden has one or two wells, from which the trees are watered by a Persian wheel mg a cocoa nut garden, a bed is prepared, had in st, at the beginning of the ramy season, from twenty to forty true, ripe, unhusked nuts are plant-ed z feet deep. In bed is kept soaked with water, and after from three to six months the nut begins to sprout. The seedlings are left undisturbed for two years. They are then, at the beginning of the rains, planted in sandy soil in rows about 18 feet apart, and with a distance of about If feet between the plants For about a foot and a half round each plant the ground is hollowed 3 or 4 inches deep, and during the dry months the plants are agreed daily or once in two days, and, once or twice in the year, enriched with fish manure or with a mixture of salt and nachni When nine years old the trees begin to yield nuts twice a year and sometimes thrice, 120 nuts being the yearly average yield from each tree. The trees are then ready to be tapped. Each cocoa-palm, when ready for tapping, is estimated to represent an average outlay of about 18s (Ro)

The cocoa-nut gardens are generally owned by high-caste Hindus who let the trees to some rich Bhandars who has agreed to supply the owner

Bombay 1529

-	
cocos nucifera.	The Cocoa-nut Palm.
CULTIVA-TION.	of the liquor-shops with fermented or distilled joice. The Bhandari pay the for every three trees hand District it is stated. The best and oldest trees to twelve months to dry on the tree. When dry they are taken down generally in April or May, or left to drop. When dry they are taken down either kept in the following the drop. When taken down they are taken down they are to tree to thrown into a well and left there for three months, when they sprout If the nuts are left to drop from the tree, which is the usual practice in Bassein, they are either kept in the house for some time and then left to sprout in a well, or they are buried inmediately after they have fallen. When the nuts are ready for planting they are buried either entirely or from one half to two thirds in sweet land, generally from 1 to 2 feet apart, and sometimes as close as 9 inches. A little grass, rice-straw, or dry plantam leaves are spread over the nuts to shade them. If white ground is damp and their mner moisture is enough for their nourishment, the nuts want watering every second or third day until rain falls. The nuts begin to sprout from four to are months after they are planted, and when the seedlings are a year or enough and when the seedlings are a year or enougher months.
1530	are planted out the sound trees are shaded by paim leaves or by growing mutheli plantains. During the rains, from its fifth to its tenth sear, a dich is dug round the paim and its roots cut, and little sandblanks are raised round the tree to keep the rain-water from running off. In the dich round the tree, 22 pounds (4 phylis) of powdered deg fish matter of cost-dung and socialists covered with earth; for rightend, which on the whole is the best manure. Palms suffer from an insect named though when palms to the roots of the tree, and from the large block, carpenter-bee which bores the spikes of its ball-opened leaves. When a palm is suffering from the attacks of the bhones, a drik red juce occase from the trunk. When this is noticed, a hole 3 incl es square is cut in the trunk from 4 to 6 feet above where the juce is coming out, and is 6"d with sal", which diver a way or kills the insect. To get rid of the bone, a tenth grows a seasofiet da water or salt-water.

	20202
The Cocoa-nut Palm.	cocos nucifera.
"A well-watered and manured tree, in good soil, begins to yield when it is five years old, and in bad soil when it is eight or ten years old. A palm varies in height from 50 to 100 feet, and is in greatest vigour between the ages of the entry and forty. It continues to yield till it is eighty, and lives to be a hundred.  "When the tree begins to ""." at the bottom of which is a After about a fortught the try perfection. Many of the young muts and on, and only a lew reach maturity. A young nut is called bonda, a nut with a newly-formed kernel is called shale, and a fully-formed nut narel. A good tree yields three or four times a year, the average number of nuts being about seventy-five" (Cas., XIII., 1, 25).  In the report of the Kāthuakr District (Bomb Gaz., VIII., p. 95), there occurs a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting account of the cocoa-nut: "At Mahura 1822." I receive a short but interesting a short a short of the community of the cocoa-nut; and an	ULTIVA- ZION.

COCOS nucifera. CULTIVA-TION

The Cocoa-nut Palm.

of the liquor-shops with fermented or distilled truce. The Bhandan pays

the owner of the garden R1 (2 shillings) a month for every three trees" (Kolaba Dist , Bomb Gas , XI , 28) Of the Thana District it is stated-"The seed-nuts are prepared in different ways. The best and oldest tree in the garden is set apart for growing seed-nuts. The nuts take from seven to twelve months to dry on the tree When dry they are taken down, generally in April or May, or left to drop. When taken down they are either kept in the house for two to three months to let half of the water in the nut dry, or, if the fibrous outer shell is not dry, they are laid on the houseroof or tied to a tree to dry. After the nuts are dry, they are sometimes thrown into a well and left there for three months, when they sprout If the nuts are left to drop from the tree, which is the usual practice in Bassein, they are either kept in the house for some time and then left to sprout in a well, or they are buried immediately after they have When the nuts are ready for planting they are buried either entirely or from one half to two thirds in sweet land, generally from 1 to 2 feet apart, and sometimes as close as 9 inches A little grass, rice-straw, or dry plantain leaves are spread over the nuts to shade them ants get at the nuts the grass is taken away, and some salt or salush mud mixed with wood ashes and a second layer of earth is laid over the nuts Nut, are sometimes planted as late as August (Shravan), but the regular season is from March to May (Chaitra and Vaishakk), when, unless the ground is damp and their inner moisture is enough for their nourishment, the nuts want watering every second or third day until rain falls. The nuts begin to sprout from four to six months after they are planted, and when the seedings are a year or eighteen months, or, what is better, two years old they are fit for planting. At Bassein the price of seedlings varies from 5d (3 annas 4 pie) for a one or one and a half year old seedling, to 6d (4 annus) for a two-year-old plant. In planting them out the seedlings are set about six yards (12 hats) apart in the 2-feet-deep holes, in which about 11 pounds (2 tipris) of wood-ashes have been laid to keep off whiteants, and the garden must be very carefully fenced to keep off cattle plants are then watered every second day it not every day, for the first year, every third day, if not every second day, for the sex and a d third sear, and every third day, if possible, for the fourth and fifth year ing is then generally stopped, though some Bassein gardeners go on water mg groun trees every seventh or eighth day. For two years after they are planted out the young trees are shaded by palm leaves or by growing muthels plantains. During the runs, from its fifth to its tenth seve, a ditch is dug round the palm and its roots cut, and little sandbanks are rused round the tree to keep the rain nater from running off the duch round the tree, 22 pounds (4 payles) of powdered dry fish manure (kuta) is sprinkled and covered with earth, and watered if there is no run at the time. Besides fish manure the palms get salt-mid (Lhara chebbal) covered with the leaves of the croton-oil plant, jepdl er and (Croton Tiglium), and after five or six days with a layer of earth, or they get a mixture of cow-dung and wood-ashes covered with earth; or night-soil, which on the whole is the best manure. Palms suffer from an insect named bhongs which grows the roots of the tree, and from the large black carpenter-bee which bores the spikes of its half-opened leaves When a palm is suffering from the attacks of the bhongs, a dark red purce ours from the trunk. When this is noticed, a hole 3 incles equare is cur in the trunk from 4 to 6 feet above where the juice is coming out, and is filled with sale, which de see away or kills the insect of the boring ber, it is either drawn out by the hand, or it is killed by pour ng in o the spike assalureda water or sal -water

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422	Dictionary of the Economic
cocos nucifera	The Cocoa-nut Paim.
CULTIVATION	land, while the imports from the Maldives are returned as from foreign territory. Last year the Maldives sent 7,897 453 cocoa-nuts to India, and the Nicobar Islands 4,510,000. Of the inhabitants of these groups of islands it is not reported that they manufacture core, and apparently they prepare only a small amount of copra, although they sell their nuts at a price far below that which prevails on the manufand of India.
1532	Writers in Europe, who have described the commercial article Coir, are in the habit of placing the coir from Cockin in the first rank Some doubt seems to be associated, however, with the commercial term "Cockin Corr". The small Native State probably alluded is described in the Imperial Ganetteer as "possessing no important trade by sea or land" it seems impossible to believe that all the coir returned under the name of "Cochin Corr" could therefore come from Cochin Indeed, the suspicion exists that the better class of Malabar and Laccadive coir, consigned to Europe, may be so designated, if not also some of the exports of cor from Cochin-China and the Straits. In the returns of the exports of cor from Cochin-China and the Straits. In the returns of the exports of cor from Cochin by sea amounted to only 689 cut, valued at R4,134, and manufactured coir 2,777 cut, valued at R2,330 these were all sent to Bengal or Bombay, how much may have gone by land to Madras cannot be discovered. It is significant that Dr Short in his Monograph on the exceanut palm, which has just appeared, makes no mention of Cochin coir. Repeated reference will have to be made, in subsequent pages, to the Laccadive and Malabar coir and the other cocao-nut prolatic.
1533	regions, so that we shall here content ourselves with this brief notice of Madras concluding only by giving the description of the cultivation given in Morra's Descriptive and Historical Actional of the Godacery District. "Young plants of a year's growth are planted out, and watered for six years, after which they do not require much water. The trees generally bear fruit about the ninth year after transplantation. The expenses of cultivation are struct to be R668 for a path of Ind,—namely, R140 being the price of 600 young plants, R48 being the value of the labour required for planting them and R480 being the wages of labourer, employed to water and tend the trees until they come into bearing. When the trees begin to bear fruit, the value of the produce of a tree evulsives of the fore is estimated at about 12 annus a year, making the total value of the produce in a path of land R500" [6, 70].
Hysore 1534	III In Mysore "there are four varieties of the cocot nut sit, red and, red mixed with green, 3rd, but green, and 4th, dark green. These varieties are permanent, but although the red is reckoned somewhat better than the others, they are commonly sold promiscuously. Their produce is nearly the same.  "The sol does not answer in the Bingalore district unless water can be had on digging into it to the depth of 3 or 4 cultits, and in such situations a light sindly soil is the best. The black clay, culted ire, is the next best sol. The worst is the red clay, culted ire, is the next best sol. The worst is the red clay, culted ire, is the next best sol. The worst is the red clay, culted ire, is the next best sol. The worst is the red clay, culted ire, is the next best sol. The worst is the red clay, culted ire, is the next best sol. The worst sold answer tolerably well.  "The minime of forming a new ecocoantic garden is at follows. The nuts intended for seed must be allowed to ripen until they fall from the tre, and must then be dried in the open air for a month without having the house removed. A plot for a nursery is then dug to the depth of a feet, and the sol is allowed to dry three days. On the Ugash feast fin March) remove 1 foot of earth from the nursery and cover the surface of the plot with 3 inches of sand. On this, place the nuts close to earth other, with the end containing the eye uppermost. Cover them with 3 inches of sand and 2 of earth. If the supply of water be from C. 1534

The Cocoa-nut Palma

COCOS nucifera.

a well, the plot must once a day be watered, but if a more copious supply can be had from a reservoir, one watering in the three days is sufficient. In three months the steedlings are fit for being transplanted. By this time the garden must have been enclosed, and hoed to the depth of 2 feet. Holes are then dug for the reception of the seedlings at 20 feet distance from each other in all directions, for when planted nearer they do not thrive. The holes are 2 feet deep and a cubit wide. At the bottom is put sand 7 inches deep, and on this is placed the nut with the young tree adhering to it. Sand is now put in until it rises a cuches above the nut, and then the hole is filled with earth and a little dung. Every day for three years, except when it rains, the young tree must have water.

"The cocoa nut palm begins to produce when seven or night years old, and lives so long that its period of duration cannot read ly be ascertained. Young trees, however, produce more fruit which comes forward at all seasons of the year. A good tree gives annually a fundred nuts. A few are cut green on account of the juice, which is used as drink, but

by far the greater part are allowed to

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the cult a constitute the situation for these gardens must be rather low, but it is not necessary that the late.

place will answer in which water can

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is reckoned very bad The cocoa-nut

second day for six months the seed must be watered with a pot, and then the young palms are fit for being transplanted

Whenever, during mer gives ighed five

and next

dung is put, and the young plants, having been previously well watered to loosen the soil, are taken up and one is placed in each pit. The shell arth so months

s every After-

wards they require no water

Every year the garden is cultivated for rags, uddu, hesaru, or whatover other grain the soil is fitted for, and is well dunged, and at the same
time four oxi-loads of red mud are laid on the garden for every tree that
it contain while a little freshearth is gathered up towards the roots of the
palms. The crop of grain is but poor, and injures the palms, it is always
taken, however, as, in order to keep down the weeds, the ground must
at any rate be ploughed, as the manure must be given and as no rent
is paid for the grain. On this kind of ground the cocca-nut palm begins

cocos nucifera.

## The Cocca-rut Palm.

Chiliny-

to bear in twilse or theteen years, and a minutes in perfection at our viety years. It dies altografies after bearing for about a fundred years. They are allowed in die, and when they begin to dreay a young one is planted never to old one to supply its place.

"In this country, wine is never extracted from this palen, for that operation destroys the fruit, and these when type are considered as the saluable part of the produce. A few green nuts are cut in the bet seemen, on account of the refereding fince which they then contain, and to make concernes that this also is thought to injure the crop. The core made from the type nuts is very bad, and their busks are commonly burned for fuel

"The crop begins in the second month after the summer solute, and continues four months. A bunch is known to be tipe when a nut 'fil's down, and it is then cut. Tuch pilm produces from three to ear bunches, which tipen successively. A middling palm produces from 6s to 70 mits. As the muis are guthered they are collected in small hust, rused from the ground on posts. When a merchant offers, the rind is removed at this expense, by a man who fixes an irra rod in the ground, and forces its upper end, which is sharp, through the fibres, by which means the whole bush is speedly removed. He then, by a single blow with a crooked knile, breaks the shell without hurting the kernel, which is then fit for sile and is called Lofgars' A man can duly clean 1,300 mits. From 20 to 20 per cent of them me found rotten "(Wisser Giss. 1, 747-734).

IV Nicobar Islands, 1535 30 per cent of them are found rotten "1,150** Use, 1,151**131.

IV On the Ausobie Islands the ecoca-nut paint is very abundant, although, as already stated, it exists only under recent cultivation on the Andaman Falands, but responses still writher to the north on the group of the Cocos Islands. Six W. W. Hunter gives an interesting account of the Nicobia trade in occasints which may be here quoted. "At present the principal product of these islands is the cocoa-nut paint, and its ripe nuts form the chief expent?" "The northern islands are said to vield annually to million cocoa nuts, of which about half are exported. The estimated number exported in 1881 82 was 4,575,000. As this important product is six times cheaper here than on the ecast of Bengul or in the Straits of Malacca, the number of English and Malay seeses that come to the Nicobars is every year increasing." "The tride in ecocon nuts is earned on chiefly by nature certal from Burms, the Straits Settlements, extended the islands for ecocas-nuts in 1881-52." The Administration Report for 1885-58 gives the exports as 4,510,000 muts and 8,730 bags of copyr. In that year 49 vessels, with an aggregate toning of 8,218 times, obtained permission to trade with the Nicobar Islands for ecocas-nuts. The same report states that there are now 112,000 ecocas-nut palms under cultivation at Port Blane.

v. Burma 1536

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Bengal. 1537 N Of Burma it is reported that the cocca-nut is "largely cultivated, and might be much more so in many places along the Arakin coast as it is in Ceylon, and as doubless it would be but for the sparseness of population, the difficulties of approaching the coast except it a few spots, and the assence of the means of land communication between the ports and the sites fitted for the production of the trees." In the Bassein district of Pegu it

has been stated that there are 10,000 acres under cocoa muts VI In Bengal, while the palm is plentful throughout the lower Gangetic basin, it exists only in garden cultivation, and the produce is not much in excess of the local demand. There are no large plantations such as have been described in Madras, Mysore, and Bombay, because in Bengal the dite-palm is used as the source of palm juice or toddy and not the cocoanit. It is, however, fairly abundant in Noakhally, Backergan, Jessore, and the 24-Parganas.

The Cocca-nut is alluded to in many works, but only as an article of import and export; it is not cultivated. Dr. Hartwig (Trajtical and an article of import and export; it is not cultivated. Dr. Hartwig (Trajtical and in the following with and grow the trees forth no to bend over the rolling surface, and to drop its fruits into the tidal wave.  **Cocca-nut**  It is commonly stated thu; if the soil be too fich a large grub with a reddish-brown head soon finds its way to the roots and into the stem. This cats its way through the tissues until the leaves turn yellow, the terrimal) bud withers, and the tree is killed. This appears to be the beetle known as Butocrear rubus. In the Strauts of Milacca, the chief natural enemy of the tree is a species of elephant-beetle, which begins by nubbling the leaves into the shape of a fan; it then perforates the central pulls fifter, so that the lead snap, off, and lastly, it descends into the folds of the supper shoot, where it bores itself a nest, and, if not speeddy extracted or killed, soon destors is the rea. A similar kind of	· · · · · · · · · · · · · · · · · · ·	
enly as an article of import and export; it is not culturated. Dr. Hartwig (Trepical dump as an article of import and grow the trees forth no to bend over the rolling surface, and to drop its fruits into the tidal wave.  **Covered an inch beach, and watered white shoot containing the foliaceous rudiments springs from one of the three holes in the white shoot containing the foliaceous rudiments springs from one of the three holes in the remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower the remains but where, and the tree is killed. This appears to be the beetle known as Butoceta muns. In the Strauts of Milacca, the chief natural enemy of the tree is a species of elephant-beetle, which begins by hibbling the leaves into the shape of a fan; it then perforates the central pulls fibre, so that the leaf sings, off, and lastly, it descends into the folds of the upper shoot, where it bores itself a nest, and, if not speeddy extracted of killed, soon destors, the tree. A similar kind of	The Cocca-nut Paim.	cocos
drip is a and grow the trees forth no. to bend over the rolling surface, and to drop its fruits into the tidal wave.  Are covered an inch beach, and watered white shoot containing the foliaceous rudiments springs from one of the three holes in the remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the nut forming a sort of arm of attachment. The lower remains within the sort face is killed. This appears to be the located known as Butocera rubus. In the Strauts of Milacca, the chief natural enemy of the tree is a specially expected with the strauts of Milacca, the chief natural enemy of the tree is a specially straight of the strauts of Milacca, the chief natural enemy of the tree is a specially straight of the strauts of Milacca, the chief natural enemy of the tree is a specially straight of the strauts of Milacca, the chief natural enemy of the tree is a specially straight of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natural enemy of the strauts of Milacca, the chief natur	only as an article of import and export; it is not cultivated. Dr. Hartwig	TION.
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ENRIFES TO THE COCOL-VOT.  It is commonly stated thru if the soil be too fich a large grub with a reddish-brown head soon finds its way to the roots and into the stem. This cats its way through the tissues until the leaves turn yellow, the terminal bud withers, and the tree is killed. This appears to be the beetle known as Butocera rubus. "In the Straits of Milacca, the chief natural enemy of the tree is a species of elephant-beetle, which begins by nibbling the leaves into the shape of a fan; it then perforates the central pith; fibre, so that the leaf snaps off, and lastly, it descends into the folds of the upper shoot, where it bores itself a nest, and, if not speeddy extracted or killed, soon destroys the tree. A similar kind of	are covered an inch beach, and watered white shoot contain-	1539
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a long iron needle or probe, having a barb like that of a fish-hook. By using this and by pouring satt or brine on the top of the tree, so as to descend amongst the folds of the upper shoots, the evil may be pre-ented	It is commonly stated that if the soil be too rich a large grub with a reddish-broun head soon finds its way to the roots and into the stem. This eats its way through the trissues until the leaves turn yellow, the terminal bad withers, and the tree is killed. This appears to be the beatle known as Batoecta rubus. In the Strains of Maiacac, the chief natural enemy of the tree is a species of elephant-beetle, which begins by nibbling the leaves into the shape of a fair, it then perforates the central pith; fibre, so that the leaf snaps off, and lastly, it descends into the folds of the upper shoot, where it bores itself a nest, and, if not speeddy extracted or killed, soon destroys the tree. A similar kind of beetle is known on the Coromandel coast, and is extracted by means of a long iron needle or probe, having a barb like that of a fish-hook. By using this and by nouring salt or prince on the too of the tree so as to	1540

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cocos nucilera.

The Coces rat Palm.

CULTIVA-

to bear in thelic well eteen sours, and continues in prefection about we's years. It dies als getter after beating I gale in a londred years. They are always all with itself, and when they beginn to dreay a young one is finited four itself the diese to say, if it is place.

"In the country, wine is never extracted from the palm, I r that operation destroys it clima, and there when yet are considered as it established part of it eperature. A few green nuts are cut in the let seroon, on account of the refreshing juce which they then contain, and it make contrope that this value is thought throught the crop. It earn and from

the ripe inuts is very lad, and their busks are extinously bursed for fuel. "He except begins in the second month after the summer solid continues four troubles. A bunch is known to be ripe when a nut falls down, and it is then cut. Lach palm privales from three to see function, and it is then cut. Lach palm privales from three to see function. A middling palm produces from 65 to 70 nuts. As the nuts are gethered they are collected in small huts, rused from the proxind on posts. When a merchant clies, it is rund is removed at his expense, by a man who fives an irry rod in the ground, and forces its upper end, which is sharp, through the fibres, by which means the whole hust is speedily removed. Hether, by a single flow with a crocked kinde, breaks the shell without hurting the kernel which is then fit for sile and is called Lappen. A man can duly clean 1,750 nuts. From 20 to

Nicobar Islands, 1535

30 per cent of them are found rotten" (Mysore Gas 1 131-134). IV On the Ascel ir Isl ir to the cocon not palm is very abundant, although as already stated, it exists only under recent cultivation on the Andaman Islands but response still further to the north on the group of the Cocos Islands Sir W W Hunter gives an interesting account of the "At present Nicobar trade in cocoa nuts which may be here quoted the principal product of these islands is the cocoa-nut palm, and its ripe nuts form the chief export " "The northern islands are said to yield annually to million cocoa nuts, of which about half are exported. The estimated number exported in 1931 82 was 4,570,000. As this important product is six times cherper here than on the coast of Bengal or in the Stratts of Malacca, the number of English and Malay vessels that come to the Nicobars is every year increasing" . The trade in cocoa nut is entried on chiefly by native craft from Burma, the Straits Settlements Ceylon, &c Porty ressels of an aggregate tonnage of 6 270 tons visited the islands for cocon-nuts in 1881-82. The Administration Report for 1885 86 gives the exports as 4,510,000 nuts and 5,730 bags of copra. In that year 49 vessels, with an aggregate tonnage of 8 218 tons, obtained permission to trade with the Nicobar Islands for coconnuts, &c The same report states that there are now 112,000 cocoa nut palms under cultivation at Port Blass. V Of Burma it is reported that the cocoa-nut is "largely cultivated,

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VI Bengal 1537

sence of the means of land communication between the ports and the sites fitted for the production of the trees." In the Bassen district of Pegu it has been stated that there are 10,000 acres under cocca nuts

VI In Bengal, while the prim is plential throughout the lower Gangetic basin, it exists only in garden cultivation, and the produce is not much in excess of the local demand. There are no large plantations such as have been described in Madras, Misore, and Bombry, because in Bengal the date-palm is used as the source of plin juice or toddy and not the ecocanit. It is, however, furily abundant in Noakhalla, Backerganj, Jessore, and the 24-Parganas.

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the difficulties of approaching the coast except at a few spots, and the ab-

C 1537

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The Cocoa-nut Palm	cocos
VII. In Upper India the cocoa-nut is alluded to in many works, but only as an article of import and export, it is not cultivated. Dr Hartwig Tropical World years. "This noble palm requires an atmosphere dump with the spray and moisture of the sea to acquire its full strictiness and growth, and, while idong the bleak shores of the Northern Ocean the trees are generally bent landward by the rough ser breeze, and send forth no branches to face its violence, the cocoa, on the contrary, loves to bend over the rolling surface, and to drop its fruits into the tidal wave Wafted by the winds and current over the sea, the nuts float along without losing their germinating power, like other seeds which migrate through the air, and thus, during the lapse of centuries, the Cocon-prim has spread its wide dominion from coast to coast, through the whole extent of the	CULTIVA- TION VII Upper India 1538
tropical zone."  VIII Cop Jon — Spenking of Ceylon cultivation Mr Treloarssys. "The ripe nuts are first planted in a nursery, where they are covered an inch deep with sand and sea weed or soft mud from the beach, and watered drily til they germinate. In two or three months a white shoot containing the foliaceous rudiments springs from one of the three holes in the end of the nut, the radicals emerging from the other two orifices opposite to the shoot, and penetrate the ground." This is not quite a correct description of the germination. The leaf-stalk of the cotyledon elongates and pushes the embryo boddy out of the seed. The blade of the cotyledor remains within the nut forming a sort of arm of attachment. The lower point of the projected embryo elongates and forms the toots, and from a sist in the cotyledonar sheath the plumule or stem makes at appearance. The "three holes" on the nut are all close together, not "opposite" as in the above description and are only spots not holes. But Mr Treloar proceds. "The nuts set in April, grow large enough in about four months to be planted out before the annual rains, but for the next two or three years or more the young plants require constant care. They must be watered and shuded from the given of the sun by sectens of platted leaves from the coccanut tree or the fan-shaped fronds of the palmyra."	1539
Enemies to the Cocoa-vut.  It is commonly stated that if the soil be too rich a large grub with a reddish-brown head soon finds its way to the roots and into the stem	
This eats its way through the tissues until the leaves turn yellow, the	1

terminal bud withers, and the tree is killed. This appears to be the beetle known as Butocera tubus. In the Straits of Malacca, the chief natural enemy of the tree is a species of elephant beetle, which begins by nibbling the leaves into the shape of a fan, it then perforates the central pith, fibre, so that the leaf snaps off, and listly, it descends into the folds of the upper shoot, where it bores itself a nest, and, if not speedily extracted or killed, soon destroys the tree. A similar kind of beetle is known on the Coromandel coast, and is extracted by means of a long from needle or probe, having a barb like that of a fish-hook. By using this and by pouring saft or brine on the top of the tree, so as to descend amongst the folds of the upper shoots, the call may be prevented or got and of the destructive beetle is known to entomologists as Calandra palmarum, but still mother beetle bores round holes into the stem itself and lives there Rats, flying-foxes, and squirrels injure the tree and sometimes kill it by eating the tender terminal bud or cabbage equally necessary to protect the trees from wild hogs, elephants, cows, por-cupines, all of which grace on the young plants. But of the dangers to which the cocoa nut is subject none are so great as the attacks of beetles, two of which are alluded to above. Mr. Tretoar says of Ceylon "Still

C. 1542

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cocos nucifera.	The Coccasinat Palm; Cole Fibre.
TION 1543	more form dable is the conveniency beetle (Batorera radius), which wats to please the ten for trunk near the ground, and to depose it eggs in the casify whence the young grads, directly they are historical, begin to extend
1544	their was up through the centre of the tree to the young leafeards at the devastated by the centre of the tree to the young leafeards at the devastated by the calamity is
1545	The Burmans are great adepts at detecting the beetles in date and cocca-nut palms and extract them as prized articles of find.
GUM	GUM.
1540	The stem of this well-known tree is in Taheiti said to yield gum. It forms large stalactitic masses, red-brown, translucent or transparent, (55pm; 5meyel.) Ocoke, in his report on Gum and Gum-tesins, says that this gum was sent to the Madras Exhibition of 1855 from Taxancore. No other author appears to allude to this gum however, and it therefore, seems probable that if produced it is met with only in certain localities. The writer cannot recoilect ever having seen a gum adhering to the stems of the palm.
DAE	DYE.
¥547	"In a patent obtained by Mr. J. H. Baker (No. 5139, March 20th 1828) the whole or every part of this tree is claimed as a dye-ware, especially the husk enclosing the fruit, and the foot-stalks of the leaves. The dye was to be extracted by water, cold or boiling, or by solutions of lime, potash, ammonia, &c., and was to serve for dyeing nankeens, blueblacks, &c. The infusion was likewise to serve as a substitute for nutralls in Turkey-red dyeing. The material does not appear ever to have come into practical use." (Grooker.)  Mr. Liotard says of this dive property: "Produces a dirty-brown
1548	"Drury remarks that "the shell when burnt fine powder and mixed with chunam is used Coccanut oil is frequently employed in solout to slik," pose of the coc. ""
1549	aware of the dye pro- lasterers both in India ne or colour wishes it For this purpose
1550	ements (see No. 1626
COIR FIBRE.	COIR FIBRE
I55I Leaf-Stalks I552	The thick pericarp or outer wall of the fruit yields the valuable cork ribbs of commerce. The SHBYHS of the leaves are used to wrap up articles, and as paper to write upon. At the Colonial and Indian Exhibition the
Tomentum 1553	splints useful
1553 Cofr 1554	often s
*D34 (	- inportation into your and your parties of the par
	C. 1554

COCOS · nucifera.

ed at a time of a come doors at Maisoniam traver materams. Erret 1727 E. Francy, a to a fall a go ate & propares a men in green. "The wind private is an in Austi willing in the tome leader a it feetle, an ame

gui li lili frima e vie qui i est e propiate de vire si qui mes prima Presse prim Proporcii (1 e le le le Presse) i Transaga e vitanto e e elle Tem, fin e prima

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42 ha git ma in the the comments where in Alberta page on a way of a from fold a, the are to take of fering as a well concluded to refer of man a fre gre office. It is per red egit in the even the pedie of a respective give of an e etra eed from Cochey the La call cee, Mal au, Matali e, Certin, Singae grove he transfer scome trescore e a con for the metion is once the equal to elithe fire and a mate, and gime m to trate ocale negatives ant self sences. Put there are seller e my ferations. Coma m gat er es me and noted fromme of the a w somet por larger and of them there a for the greed a ne meet gier. Hert aute flegencas"e fin the empote et forer en bo all red for the fire was lar, out take in the concesse immediate formed and on thresher encount with A greent elegatelepen to go on the exilient in ed the fruit at the exact time the fine is mare r. as the at " west by an man stresstem of energing to segan beteans githe flor, enoughereathe man pulatice ent ularmento po atu e the auger of me attea et e in Mente will He Backson's effect in out paral "The fire appears in the market in the use degrees of frome a despire togen the agreat at the course of was out as I fushed, as I the cure that med in steep out and cleaning." Mr. Teeloar rases "The count in teatures are that the comminer and ensure five comes from the oil outs, and the fore, I gl ter qual to from the new ; but there are, ed course, ever cal differences in the qualities brought from each I ka'ts, and the Cont a are usually the best" "Here let it be parerthete ally but em, barica'y femarked that any attempt to give to an annut flee a facer but fo the frecess of the bing is to destroy its quality of it be good, and if it be of comm a quality to make it alm is wrethle it

Properties of the l'ibre and Season when Mature - Tie Coct n has the PROPERTIES putest fur ar I fetc'es the best price " On this account it has been customary to imitate the by Uraclane "Cocus nut file is tough elastic springs, casily manipulated with a certain limits, and eminently suitable for manufactures where I ghiness, cleanliness, and great indestructibility are required. It will stand water, is almost impervious to wind and wave, or to damp and rain, and, as we have seen, il satisfies in the saline breath of the seas but it will not stand bleaching. It gives up when confronted with sulphune acid, chlori le of tin, or any other chemicals which are doughed to convert it into a sham product. For this reason we use none but untleveled floggy guy of a y w to feet, seg, and aid

much impaired by waiting for the nuts to arrive at maturity, consequently, for fibrous purposes, the latter are usually cut at about the tenth month.

coin 1555

cocos nucifera,

The Cocoa-nut Palm. Colr Fibre.

PROPERTIES OF COIR.

If cut earlier than this, the fibre is weak, if later, it becomes coarse and hard, requires a longer sorking, and is more difficult to manufacture" Dr. Buchanan Hamilton in his journey across Mysore states (1, 156) the green cocon nuts are sold for their hunks, from which fibre is extracted, but the husks of the ripe cocon-nuts are commonly burnt for fuel (11,50) At the same time immense quantities of apparently ripe cocon-nuts, in husk, are sent to Europe, the coar from the husk being there separated, elemed, and manufactured Mr Jackson of Kew, in the Planters' Gazette, describing a visit to Messrs Chubb, Round & Co's factory, gives an interesting account of the process of husking there pursued. He says "The enormous heap of husks-which, indeed, is known in the locality as the 'mount vin' -comes upon view immediately upon entering the premises, and one can scarcely, at first sight, realise the fact that the enormous pile is composed entirely of these apparently useless portions of the fruit. At the time of my visit this reserve stock of husks was estimated at considerably over a million and a half." Cocoa-nuts, or, as they are generally termed in the trade, "Cocker-nuts," to distinguish them from the Theobroma Cocao, which furnishes cocoa and chocolate, are shipped principally from Trinidad, Juniucs, Demerara, Tobago, several of the other Leeward Islands in the British West Indies, Colon, Belize (British Honduras), all round the coast of America, and the Iru Islands Nearly all the nuts are imported in the husk or outer covering, from which, on arrival, they are stripped by men using two fine pointed steel chisels, and who, by constant practice, become so skilful in the art that many are able to open 1,000 to 1,200 nuts per day. The nuts themselves after being removed from the husts are generally sold to wholesale fruit dealers, who, in turn, supply the retailers, costermongers and others, &c" In the above passage Mr Jackson has furnished the Indian people with India is not enumerated by him as one of the countries that furnish cocoa nuts to England, the fibre of what appear to be mature cocoa nuts is actually used, the consumption of cocoa nuts repeated to be matter coroa nuts is actually used, the consumption of cocoa nut kernel has in England attuned a vast proportion and the fibre can be clerned after apparently having been kept for years on the nut. These facts open up a new field of trade of which with a little assistance the Nicobar and Laccadive Islands might profitably and without lear of any rival hope to entov a large share

separation of coir. 1556 Separation of Corr in India—"The removal of the fibre from the shell is effected by forcing the nut upon a pointed implement stuck into the ground, in this way a man can clean 1,000 nuts a day. The fibrous husks are next submitted to a soaking, which is variously conducted. In some places they are placed in pits of salt or brackish water, for 6 to 18 months, in other places, fresh water is used, but it becomes foul and injures the colour of the fibre. The chief point to be considered is the draation of the soaking, if it be continued too long, the fibre will be weakened; if it be crutalled, the subsequent extraction and cleaning of the fibre will be rendered more difficult. The most approved plan of conducting the soaking is in tanks of stone, brick, iron, or wood, sterm is todinated to warm the water. By this ments the operation is rendered very much shorter, and the fibre is softened and improved. The further separation of the fibre from the husk is trigely effected by band. After thorough soaking, the husks are beaten with eavy, swooder mallets; and then rubbed between the hands.' (Spent Encyclop. Royle and Marshall give the same facts).

Robinson describes the separating and cleaning of the fibre as practised in the Laccadive Islands as follows "When sorked sufficiently long, it is taken out of the pit and beaten with a heavy miller Subsequently it is said to be rubbed with the hands until all the interstital

The Cocoa-put Palm Cour Fibre.

COCOS nucıfera SEPARATION OF COIR.

cellular substance is separated from the fibrous portion When guite clean it is arranged into a loose roving preparatory to being twisted, which is done between the palms of the hands in a very ingenious way, so as to produce a yarn of two strands at once"

"As the husk gets hard and woody if the fruit is allowed to become quite ripe, the proper time for cutting it is about the tenth month cut before this, the coir is weak, if later, it becomes coarse and hard, and more difficult to twist, and requires to be longer in the soaking pit, and thus becomes darker in colour. When cut, the husk is severed from the nut and thrown into soaking pits These, in some of the islands, are merely holes in the sand, just within the influence of the salt water Here they lie buried for a year, and are kept down by heaps of stones thrown over them to protect them from the ripple In others, the soaking pits are fresh water tanks behind the crest of coral. In these, the water, not being changed, becomes foul and dark coloured which affects the colour of the corr When thoroughly soaked, the fibrous parts are easily separated from the woody by beating If taken out of the pits too early, it is d flicult to free the corr from impurities, if left in too long, the fibre is weakened, as is said to be the case also with that soaked in fresh water" (Robinson's Report on the Laccadives) In the Maldives (neighbouring islands under the suzerainty of the Governor of Ceylon) cocoanuts are very plentiful, and enormous quantities of both the nut and the fibre are exported to India and Ceylon' (See the further paragraph on trade in nuts )

From what has been said in an early paragraph regarding the cultivation of the cocoa nut palm in Mysore, it will be seen that the opinion

On the other hand Royle says 'But the fruit bearing power of the trees may be considerably improved by extracting toddy from the blossom shoots for the manufacture of jaggery during the first two years of its production after which it may be discontinued." In the Konkan the opinion is held that "if tapped the trees become unproductive much sooner"

The Bombay process of extracting the fibre is briefly described in the Bombay Gizetteer of the I hana district "The fibrous part of the outer coating is made into coir by the Bassein gardeners." For this purpose the fibres are stripped from the nuts left under water for two months, and then beaten by a wooden mallet." The writer cannot discover any detailed description of the process adopted in India generally (except that of the Laccadives) for the separation, steeping, and cleaning of the fibre, but to the best of his knowledge it agrees with what has already been given, although in the Laccadives the Malabar Coast, Ceylon, and other important coir producing countries the art is carried to greater perfection, the fibre hand aranadard chara to be non

om the Ceylon le, are

chi, and it seems possible that a coir industry might there be developed It has been reported that in Madras cocoa nut cultivation has been successfully prosecuted in the reclamation of salt impregnated lands where

cocos The Cocoa-nut Palm : Coir Fibre. nucifera. nothing else would thrive. (Gen. Admin. Report, p. 95) A curious fact in regard to cocon-nuts grown on salt marshes is conveyed by the following passage :--"The cocoa-nuts growing in mangrove soils, on the side of creeks, and more or less saturated with salt, have their milk brackish, and the sap is saline also. These trees do not suffer from the attacks of the rhinocerosbeetle, and are found to bear much sooner than those planted in a sandy soil" (p. 182-83). INTERPSTING FACTS CONNECTED WITH THE TRADE IN INDIAN COIR TRADE IN (Conf. with p. 435). COIR **ISS7** Although, as suggested, the better class fibre is most likely not produced where tapping for the juice is practised, still it should not be forgotten that the Malabar ports are the chief seats of the export of coir from India In most works ' " " " " " " " " " " - - he state-; ` ment is made that the , already stated, it is not quite. Cochin or the whole of the Malabar coast is meant, or whether Cochin coir is a mere commercial term for all good coir wherever obtained. In the Indian regions alluded to ecuted to a considerable extent. Of 15 perhaps the most important artic e but Dr. Shortt (in his Monograph on the Cocoa-nut Palm) does not apparently mention Cochin coir He states that the best Madras coir comes from the the passage quoted above from Mr. Jackson's paper Messrs Chubh, Round & Co do not, it would seem, use any Cochin fibre but prefer a husk which they separate from a mature or at least edible nut. In a recent report on the trade of Madras, the progress of the corr industry of that presidency for the past twenty-five years is shown. The average exports to foreign and Indian ports for the five years ending 1860-bit were 188220 cut; valued at R3,74,804, and for the five years ending 1882-81, they were 271,934, cut; valued at R21,79,769, while for the year 1881-82 they were R23,54,202 Of the list mentioned calculon, the exports from the Malabar coast alone amounted to R22,43,000 from these figures a definite idea may be obtained of the immense importance of Malabar and the Laccadives as the chief seats of the Indian con industry, since the Madras Presidency heads the list of Indian exports. form of the palm grown in the Island of Kıltan, Royle observes: "It requires no attention and comes into bearing ently. The tree is not so larg. ly, and Size it nut. the

The nut is also said to be more compact and oily, and to keep better than the coast nut, although, for the sake of the cor, the nut is cut before being quite tipe. How far the exports of confrom the Malabar coast correspond to Indian-grown correagned be discovered. The Northern Laccadives are administered by the Collector of Malabar and the Southern by All Raja of Cannanore Sir W. W. Hunter in the Imperial Gizetter (1711/2 324) save: "The article (cost) is paid for to the producers at fixed prices, and is sold on the coast at the market rates; the difference comstrutes the revenue or profits of trade of the Government and Ali Raji respectively. The latter pays a fixed tribute of Reo,000 (£1,000) to the

### The Cocoa-out Palm : Coir Fibre.

COLOS nucifera TRADE IN

Government on account of the islands which he manages. No change has been made for many years in the price which is given by Government for the corr produced in the islands attached to Ranara." The returns of the coastine trade of India do not specify the amounts of coir sent from the Lacenduces to Malabar, so that the somewhat interesting subject of how far the junce-extracting industry of the coast is combined with the preparation of fibre cannot be definitely learned. The following

facts are, however, instructive. IMPORTS of corr (manufactured and unmanufactured) into Madras from other Indian ports-

Imports. 1558

> Exports. 1550

1554-55 . 1886-57

183455

05.550 14.745 13,750 81.186

Cut.

FXI orrs to other Indian ports Cwt.

18/i S/m 12,66,156 7.03.255

1556-82 . Turning to the tables that give the details of these figures, it is shown that of raw or unmanufactured coir Madras receives none from British or foreign Indian ports, so that unless the Laccadives, which (as stated

. of the in the of the ucts is - trade

be any s that · cheap hame It may

to instruct the natives of the Nicobars in the art of preparing the coir fibreon art so profitably practised by their neighbours, the islanders of the Laccadnes. This is indeed one of the most hopeful aspects of a possible enhanced Indian trade in coir, until such time as the cultivation of the palm can be more vigorously prosecuted along the Coromandel coast to Burma. It seems remarkable that the cheap cocoa-nuts sold in the Nicobar Islands should attract traders from Cevion and the Straits, while India annears to make little or no effort to participate in the advantages of that trade.

## YIELD SPR NUT OF FIBRE AND PRICE.

Mr. Robinson, in his Report on the Laccadives, states that the difference in the quantity of coir manufactured from a coast nut and from an island nut is see on darable War and said to yield 6th

coast nuts will

fine island nuts go to about the or con, but this will measure 35 fathoms; all of such yarn, measuring from 70 to 75 fathoms, are made up into sooties, of which there are 14 to a bundle, averaging about a maund of 28th. A

C. 1560

1560

COCOS

The Cocos out Palm: Cole Fibre.

PRICE 1561

Mangalore cands of 560th will thus be the produce of 5 600 nuts and should contain about 20,000 fathoms of yarn. The actual price of corr received by the islanders is about Riz per cands. The value of the cor produce of a tree is calculated to be from 2 to 21 anna, and that of the produce of too trees from Rt3 to 15" "The average value of the total raw produce of a tree bearing from would then be seven annas to hill a rupee, and that of a plot of too trees, R45" For the nuts which they export to the Malabar coast they get from R7 to 10 per thousand, or rather 1,100, as to per cent is always allowed for luck in these sales The islanders export from 300 000 to 400,000 nuts annually. The natives bring their coir to the coast in Much and April, which is then received into the Government godowns. Until the venr 1820 all coir was pad for at the rate of R21-14-0 per Mangalore candy, or R25 per Calicut enndy of 640lb After that year the core was divided into three classes Since then the merige price and for a Mangalore candy of Ameendary and Kadamat cour has been R20-2-0 (or R23 per Calicut candy of 640 lb) But for the Kilian and Cheilat cours, which are the best, an average of R20-12-7 or R23-12-0 per Calicut candy is paid Ho to A D 1825-26, the Bombay and Bengal Governments took almost the whole of the coir brought from these islands, and credited the Mangalore Collectorate with R25 per candy. The price has since fallen very much during the list twenty years. It has been frequently below the price prid to the islanders, and at best has never yielded above 22 to 20 per cent profit The average imports of coir have been from 500 to 600 candies Mr Morris, in his account of the Godavery district, Madras, gives the following brief statement regarding the production and yield of coir -

"The cocor nut tree yields in excellent fibre. The quintity of fibre in the above extent of land (a pulli) is estimated at 150 maunds, yielding R93-120, at 10 Annas 1 maund. The fibre is prepared by the outer covering of the cocor-nut being moistened and beaten with wooden mailets, after the fibre has thus been loosened. The cort thus obtained is twisted into ropes. The fruit is exported, but very little of the fibre "(Morris's God.).

Dist , 70)

Spont' Encyclopadia gives the London prices of car as "Cochin — good to fine, £19 to £35 a ton, coarse, £16-101 to £19-151 Varn—good to fine, £26-101 to £46 a ton, medium, £31-51 to £28-101, common,

L14 to £22 105 , roping, £18 to £24"

USES OF COIR 1562 Uses of Coir.

"The fibrous husk of the cocca-nut is not its least valuable product, and gives rise to a very large trade, both in the Last and in Burope At first it was only used in this country (England) for stuffing mattresses and cushions, but its applications have been enlarged and its value greatly increased by mechanical processes, and in a small primphlet issued by Mr Treloar, more than twenty years ago, he stried that its natural capabilities having been brought out, our has been found suited for the production of a waterty of articles of great utility and elegrance of workmanship—table mats, fincy baskets, and bonnets, &c. In stend of being formed into rough cordage only and mass made by loand by means of ingeniously-constructed machinery the fibre is rendered sufficiently fine for the boom, and matting of different textures and coloured figures is produced, while a combination of wool in pleasing designs gives the richness and effect of hearth-rugs and capeting Brushes and brooms for household and stable purposes matting for sheep-folds, pheasantires, and pooliny vards, church cushions and hassocks,

hammocks, clothes lines, cordage of all sizes, and string for nurserymen

1563

and others, for tying up trees and other garden purposes; nosebags for

cocos

nucifera

USES OF

1564	
	invaluable as listing in a damp employed in tying the bamboos
Fibrous Sheaths. 1565	ny.—A bnef.  The finer ntly put to for propers of the fines and put to for propers of the fines and spinits. Knox 213 of Ceplon that "the filaments at the bottom of the stem of the cocca-nut may be minulactured into a coarse cloth called gunny, which is used for brgs and similar purposes."  On the young sheaths and petioles a brown-coloured cotton or tomentum will be seen similar to that already described under Borassus flabelliformis (B 680). This is sometimes collected and used by the
Cadjans. 1566	
Fronds, 1567	cocon-nut leaf These mats are of fine quality and much estermed when the complex of the sails of the smaller proving in the lates and plat the leaflets skets, and under the name of cadjons they form the usual covering of there has, as well as of the bungalous of the Europeans" "The dried frond are sometimes used as troches or for fuel, their midribs, tied together, are sometimes used as brooms for the decks of ships, as the fibres of the stalk are woody, brittle, and difficult to clean." (Royle)
	COLLECTIVE TRADE IN COCOA-NUT PRODUCTS.
TRADE IN COCOA-NUT PRODUCTS 1568	This tride, as with every other article of Indian produce or manufacture, is referable to three great sections (a) internal trade or local consumption, (b) inter-provincial trade adjusting the balance of local demand, and (c) foreign trade (eg., imports and exports) to and from India and other countries. Where the cocannit grows it is of such importance and

enters so largely into the daily life of the people, that little or nothing can be ascertained of the actual consumption The returns of road, river, and rail traffic throw some light on this, and the coasting trade affords another means of arriving at an approximate estimate of a certain proportion, but even these returns fall far short of establishing a tangible conception of the total local consumption. Wherever the palm grows, each villager, as a rule, has some trees, the produce of which is used up by himself or sold to his less fortunate neighbours, without having to go many yards from the spot where produced. At the same time, a considerable amount of the inter provincial exchange must necessarily figure again under foreign exports, or at most re exports, so that while the returns of foreign trade indicate but a very small proportion of the production, it would be unsafe to reckon these up with the available returns of coasting and inter-provincial trade To give some idea of the present position and

C. 1568

COCOS
nucifera.

### Trade in Cocca-nut Palm Products.

TRADE.

growth of the trade in the cocoa-nut palm it will not be necessary to go further back than the year 1850. Royle, in his Fibrous Plants of India, gives the imports and exports for that year compiled from the records of the following statement:

# All published Imports and Exports for 1850.

									Imports,	Exports
Nuts . Kernels Coir and t Oil . Shells Cadjans	ope		:	:	:	:	:	:	2 5,24,839 8,66,120 2,31,934 76,648 5,970 2,990	10,14 4,31,00 2,84,51 1,51,84 Nil Nil
		Ĭ	•	•	·	•	Tot	rat.	17,08,551	8,77,50

This gives a grand total of R25,86,056; that is to say, less than the foreign imports of last year. To compare with the above statement of TOTAL TRAPP, the following table of the PORTION TRAPP for 1886-87 (exclusive of all internal and inter-provincial or coasting traffic) may be given:—

## Foreign Imports and Exports for 1886-87.

	Imports.	Exports.
Nuts Copra (or kernels) Coir (unmanufactured) , (manufactured but exclusive of ropes) Oil TOTAL	\$5,98,203 11,76,799 6,839 1,30,701 7,54,515	8,462 79,836 77,391 19,14,448 13,24,589

If to the above table of foreign trade we were to add the returns (included by Royle) of coasting trade from Malabar, the Laccadives, Coromandel, Konkan, & but, as the tabl

whereas in 185 they were coning feature of factured corr a

tationary during can be accepted owing statement

## The Cocoa-nut Palm.

COCOS nucifera.

of the values of the coasting trade in cocoa-nut products during the year 1886-87:-

Coasting Trade in										Imports.	Exports.	
Nuts Kern Coir Oil	els (c	opra)	:	:	:	:	:	:	:	-	24,21,941 35,31,115 12,20,749 20,60,667	16,88,773 23,00,958 9,27,302 20,74,455
					_			Tot	AL		92,33,872	69,91,488

The table furnished by Royle for the trade in 1850 practically corre-

inter-provincial coasting traffic may reappear as exports to foreign countries or figure in the road, river, and rail traffic to interior parts of the country. While, therefore, the estimate of 223 lakhs must include dupler if not multiplex returns (e.g., Bengal imports from Malabar figuring again as

1883.84 cocco-nuts to the number of close upon two militons, valued at Regioo. In a like manner Bombas imports cocco-nut products from Madras, Ceylon, Zanzibar, &c, and distributes doubless a large pro-

conveyed to the port of shipment by internal means of transport. India is itself perhaps the largest consuming country in the world for occoa-nut products, so that, recollecting this fact, a conception of the total trade may be had by adding to the sea borne traffic an allowance for local production. Even when this has been done, a very imperfect idea will have been obtained of the value of the tree to the people of India. The mere returns of trade cannot give a just conception of the importance of a product which, like the occoa-nut, to a large population, may be said to be their source of wealth as well as their food, drulk, and occupation.

TRADE IN COIR, MANUPACTURED AND UNMANUPACTURED.

In all the returns of this subject care is taken to explain that these do not include ropes—coir ropes and cords being placed under a general heading with all vegetable cords.

 The exports of Raw Coir are, however, so insignificant that a false impression is likely to be conveyed. The so-called manufactured coir, which figures extensively in the returns, appears to be largely crude.

C. 1568

436	Dictionary of the Economic
nucifera	The Cocoa-nut Palm.
TRADE.	corr yarn which is dressed and employed by the European manufacturers, but of course a considerable trade is also done in mats, rugs, carpets, and other such manufactures. Glaneing at the figures of the forespet trade in Corr (immunufactured), the trade would seem to have practically remained stationary for many sears past, and to be too small to justify the conclusion that India participates anything like to the extent it might in meeting the home market. The exports have averiged from 1,000 to 15,000 cwt for the past twenty years they were last year 12,347 cwt, valued at R1,59 633. The Ioregia imports of coir are from Naial and Ceylon, and the bulk of these go to Bengal. The consting trade last year conveyed from one Indian port to another the following quantities of ummanufactured coir Imports 18,052 cwt and exports 17,733 cwt. Of this trade, Madras exported 15,556 cwt. And imported only 309 cwt. Bombay exported 2,146 cwt and imported 8,335 cwt, while Bengal exported only 1 cwt but imported 8,335 cwt. The bulk of the Bombay and Bengal supplies came from Madras (vis. 5,756 cwt and 7,645 cwt respectively). Of the exports to foreigh countines the United Kingdom received 10,215 cwt last year's production, and of that amount 8,940 cwt were consigned from Madras (vis. 5,756 cwt and 7,645 cwt respectively). Of the exports to foreigh countries the United Kingdom received 10,215 cwt lord last year's production, and of that amount 8,940 cwt were consigned from Madras.  JI Of Mawitacturing Coire (excluding ropes) India imported last year's production, and of that amount 8,940 cwt were consigned from Madras.  JO Mawitacturing Coire (excluding ropes) India imported last year (18,700 cwt) valued at R1,50070 and exports, Madras sent to foreign countries 185,670 cwt, valued at R1,5071, Bombay and Bengal cub sending about 20,000 cwt, 10 these exports the United Kingdom received to 1,015 cwt, and R11,6977, Bombay and Bengal cub sending about 20,000 cwt, 10 these exports, Madras sent to foreign countries 185,670 cwt, valued at

13.411 cut The Bengal and Bombay imports came mainly from Midras and Trayancore, Cochin ranking next The importance of Travancore as a seat of the coir manufacturing industry may be demonstrated by its imports into Bengal and Bombay; Madras sent 30,185 cwt., valued at R2,61,199, and Travancore 27,613 cut, valued at R2 86 277, to Bombay. Madras sent 50,264 cwt, valued at R2,72,567, and Travancore 17,327 cwl, valued at \$1,40,260. At the same time Madras last year sent a large amount to fravancore, 112, 14,283 cut, valued at R1,36 810 Of the total exports in the coasting trade (418, 134,665 cm1) Madras sent to other ports 112,642 cwt, and Bombay, next to importance, exported only Of the total coasting trade in imports (128 150 300 cwt) 21,647 Cut Bombay generally heads the let, it received last year 74 561 cut, while Beng il took bo, 500 cut, being followed by Midrie with 13,441 cut Sind and Burma are unimportant, the former received only 1,776 cwt Thur st will to seen that both in fareign and internal trade the cour industry is

COIR POPES. 1569

#### Coir Rores.

mainly concentrated in the Modean Presidency

Nothing can be fearned as to the extent of the foreign and Internal trade in coir topes and cords, since the trade returns for these are published jointly with those of all other ropes It has been said, forever, that cor strong is universally employed by the natives of India in the construction of their bamboo hats. For it is purpose alone the consump-

### The Cocoa-nut Palm: Coir Rope.

COCOS nucifera.

tion must be enormous. The merits of coir as a rope fibre are now fully COIR ROPES.

o or to million pounds are annually shipped from India. is prepared in Ceylon, but Cochin is noted as the port of shipment for the best quality of yarn, and many thousand cut are annually exported

experiments, coir cordage broke at 224lb Though not superlatively - ' it exhibits of withstandor cordage purposes, to less extensively imported

.. arton & Co., of Calcutta, placed in the Colonial and Indian Exhibition a trophy of ropes of which a striking feature was the arches of hawsers, 12 inches in diameter, thrown across the path; some of these were made of coir,

### 011_

The sheed kernel, dried at ordinary temperatures, either in the sun or artificially, contains from 30 to 50 per cent. of oil. The method of extracting this oil in India, especially when it is required to be colourless, is as follows: The kernel is boiled with water for a time, then grated and soucezed in a press. The emulsion thus obtained is next boiled until the oil is found to rise to the surface The ordinary commercial oil is

expressed by rude oil-mills worked by oxen.

The oil is white and nearly as fluid and limpid as water in tropical climates. It has a sweet and, according to some tastes an agreeable

odour when fresh, but is liable to become rancid in a short time

In Europe the oil is chiefly used in the manufacture of candles and soap. In India it is employed in cooking, and as medicine when fresh, and for burning, painting, soap-making, and ano nting the body when rancid.

Regions where Oil is Produced .- While in the above sentences a brief abstract has been given of cocm-nut oil, it is necessary to deal with this subject in grenter detail Enquiries are frequently addressed to the Government of India by mercharits interested in the trade in this substance, so that it has become necessary to pur on record as complete an account as can be collected from the scattered publications that exist, even should that prove but a statement of the Interess of our knowledge. One of the earliest, and to this day the most satisfactory descrip one of the Indian cocoa nut oil industry is that which by Lifeutenant H. P. Hawkes and published in 1857. Granteer writers have contented themselves with

C. 1570

ott. 1570

138	Dictionary of the Economic
cocos nucifera.	The Cocoa-nut Palm; Its Oil,
OIL-	treating the subject as too well known to call for any detailed description, and at most only the meagrest accounts have been given. To the merchant desirous of starting a new or extending an existing trade, the question of primary importance or district with which he shoult the cocas-nut are coir-fibre, of and spirits may be prepared. Ye extracted from the tree, that it contains in Madras and Travancore enormous quantities of both note that in Madras and Travancore enormous quantities of both note that in Madras and Travancore enormous quantities of both note that in the products of all of them, can be desired from the same trees or even prepared by the same cultivators certain plants or port ons of the plantation being several industries. Under coir fibre it unripe cocannut is alone used for that 1
	to agree that the ripe kernel is necessar instructive to know it cultivation had resulted in the production or certain races of cocoanuts famous for their oil-yielding properties, just as the inhibitants of the Laccaduse Islands appear to have developed a small-fruited one with a specially good fibre. In connection with commercial reports on ecoca-nut oil it is generally stated that the finest qualities are obtained from "Cochin." (Spon places Cochin after Ceylon.) It will be recollected that this same statement occurs regarding the fibre derived (or supposed to be derived) from that Native State. The writer has failed to discover any account of the Cochin oil industry, and is almost forced to the opinion that by "Cochin cocoanut oil," as with "Cochin coil derived from the Madras and the coching of the blocked to as the islands export perhaps
da d	an only selding of an edice.  Nobir Islands into Madras are very unimportant as compared with more recorded against Bengal, yet Madras, and not Bengal, appears to control the coccumut oil market. This fact would lead to the inference that the coccumut oil market. This fact would lead to the inference that the coccumut oil market. This fact would lead to the inference that the coccumut oil market. This fact would lead to the inference that the coccumum of the coccumum oil market. The fact would be supported to the control of t

gours I by the remembel a coar of so many green not from such time, the remainder being all well to ripen fie all purposes un as articles itte It's trad easies, from warted defects of emitting, may be accepted as soil a may the direct of a faure expension at a same of the six may sail where a fulfill that, as with our so with cours run oil. Ma feas is the

The Cocca-nut Palm: Its Oil.	cocos nucifera.
chief seat of the trade. Certain writers familiar only with Bengal (with the season of the season of the season of the season of the Maldine and Nicobar Islands,—will do well to concentrate his attention	
respect of making the old is by distributing the keepels and to a courst parts, or spirit.  Under them, after which they are exposed to the sun on mass, and when theroughly direct are subjected to pressure in an oil-press." Ballour remarks: "The purest oil is obtained by gathering the kernel and depositing it in some hollow vessel, to expose it to the heat of the sun during the day, and the	1571
oil drains away through the hollow spaces left for the purpose." Hawkes states that "the oil is generally prepared from the dried kernel of the	1572
The second of th	15/3
But a hot wet process is also adopted by which an oil is obtained which	Khobrel. 1574
seems to possess different properties from that prepared by cold expres- sion. The Thisma Garetteer describes two such oils: "To make deel the fresh kernel is scraped on an iron blade set in a wooden footstool. The scrapings are then put in a copper vessel over a slow fire, and after boil- ing are squeezed, sometimes instead of boiling them the scrapings are rubbed on a stone with a stone roller, and from time to time a little water is thrown over them. The scrapings are then squeezed and the juice builed in a copper vessel, when the oil rises to the surface and is skimmed	Avel 1575
off. To make muthed dried kernels are cut into thick pieces and boiled in water. The pieces are then crushed in water and the whole is again boiled over a slow fire, when the oil rises to the surface and is skimmed off." It is worthy of careful observation that practically the difference between dwel and muthel oil is, that the former is mide from fresh kernel; instead of from copica. Dr. Shortt says: "Boiled oil is obtained by bruising the kopra or the fresh cocca-nut, mixing it with an equal quantity of water, and then bothing the mixture. As the water enaporates the oil	Muthel 1576
rises to the surface. It is poured off, and the debris of the kernel is com- pressed by handfuls, so that any oil that remains may be extracted. Two quarts of oil are produced, on an average, from 15 to 20 nuts." In Borneo an oil expressed from the fresh occount is used as a hair-oil,	Í577
and is supposed, for that purpose, to be superior to oil obtained from copra. Hawkes says of the hot expression oil. "When required for edible purposes, the kernel of the fresh nut is taken, rasped and mixed."	1578
with a little boiling water. This yields by pressure a milky fluid  C. 1579	1579

438	Dictionary of the Economic
cocos nucifera.	The Cocoa-nnt Palm; Its Oil,
OIL.	treating the subject as too well known to call for any detailed description, and at most only the meagrest accounts have been given. To the merchant desirous of starting? new or extending an existing trade, the question of primary importance or district with which he shoul the cocon-nut are coir-fibre, or and spirits may be prepared extricted from the tree, that it is not a simple cocon-nut are coir-fibre, or and spirits may be prepared extricted from the tree, that it is not cocon in the tree, that it is not cocon in the tree, that it is not cocon in the sime trees or even prepared by the same cultivators -certain plants or port ons of the plantation being periodically set apart for these several industries. Under coir fibre it has been said that the green or unique cocon-nut is alone used for that purpose, while most writers seem to agree that the nipse kernel is necessary for the oil. It would be mot instructive to know if cultivation laid resulted in the production of certain races of cocon unts famous for their oil-yielding properties, just as the inhalt tants of the Laccadive Islands appear to have developed a smill-fruited one with a specially good fibre. In connection with commercial reports on cocon and oil it is generally stated that the finest qualities are obtained from "Cochin" (Spon places Cochin after Ceylon). It is a scallected that this same statement occurs regarding the fibre with the finest qualities and obtained. The writer has indexived from the Madras Presidency. If appearonalists are essentially necessary for the preparation of the cit then the Maldive and Nicobar Islands might be looked to as the cit then the Maldive and Nicobar Islands might be looked to as the local of grown hars of Maltias with a process of the cit then the Maldive and Nicobar Islands might be looked to as the local of grown hars of Maltias with a processor, there exists a state of the cit then the Maldive and Nicobar Islands might be looked to as the local of grown hars of Maltias with a state of the cit the fibre s

in resist at present, or that suits a therefore the house of control as yet a yet in yet in a first nices; ye only are always or period as yet a yet in a fit may, of course, be the case that it extens are, so tapeak, principly the remeasify early of a or may green only from each tree, the complete being a weed to open far of purposes or as actuals the complete of a section of the proposes of as actuals. 1164

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The Cocca-nut Palm: Its Oil.	cocos nucifera.
chief seat of the trade. Certain writers familiar only with Bengal (with	Oli
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has been offered in an early paragraph,—ris, to call in the aid of the Maldine and Nicobar Islands,—will do well to concentrate his attention on the Madras Presidency.	
Mode of Preparation of the Oil.—The ripe kernel is cut out of the shell in various ways, and either dried by exposure to the sun or by artificial	
al parts, or split Under	1571
oil drains away through the hollow spaces left for the purpose Hawkes	1572
states that "the oil is generally prepared from the dried kernel of the nut, by expression in the ordinary native mills" The Gazetteer of Thana	1573
mentions three processes of making the oil. The first, giving origin to the	Khobrel.
which are crushed in the oil-mill."	
But a hot wet process is also adopted by which an oil is obtained which seems to possess different properties from that prepared by cold expression. The Thána Gasetteer describes two such oils: "To make ével the fresh kernel is scraped on an iron blade set in a wooden footstool. The	Avel 1575
scrapings are then put in a copper vessel over a slow fire, and after boiling are squeezed; sometimes instead of boiling them the scrapings are rubbed on a stone with a stone roller, and from time to time a little water is thrown over them. The scrapings are then squeezed and the juice:	-4,5
boiled in a copper vessel, when the oil rises to the surface and is skimmed offi. To make muthel dried kernels are cut into thick pieces and boiled in water. The pieces are then crushed in water and the whole is again boiled over a slow fire, when the oil rises to the surface and is skimmed offi." It is worthy of careful observation that practically the difference	Muthet 1576
between avel and mathet oil is, that the former is made from fresh kernel instead of from copra. Dr. Shortt says: "Boiled oil is obtained by unantity the oil	
s com- Two	Í577
quarts of oil are produced, on an average, from 15 to 20 nuts" In Borneo an oil expressed from the fresh cocoa-nut is used as a hair-oil, and is supposed, for that purpose, to be superior to oil obtained from	TENQ
copra Hawkes says of the hot expression oil. "When required for edible purposes, the kernel of the fresh nut is taken, rasped and mixed with a little boiling water. This yields by pressure a milky, fluid	1578
C. 1570	1579

438	Dictionary of the Economic
COCOS nucifera.	The Cocca-out Palm: Its Oil,
OIL.	treating the subject as too well known to call for any detailed description, and the meagrest accounts have been given. To the meagrest to account and the plants of the p
	trove of teriam acainits only and the case that the trees are, and a principle of the may, of course, be the case that the trees are, and appropriate the remainder being allowed to open for of purposes or as articles the remainder being allowed to open for of purposes or as articles of diete.

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This brief terrier, from want of definite information, may be accorded
as indicating the direction that future reports might assume; but it may
safely be concluded that, as with con, so with cocusination, Maintenation

#### The Cocoa-nut Palm: Its Oil.

cocos nucifera.

practically no cocoa-nut oil, so that her exports to foreign countries and to other Indian ports were drawn exclusively from local supplies. With the

1.
155.202 gallons to Bengal. But Bengal exported coastwise o.u.o galions and Bombay 34.54. The Bengal exports went to Burma and the Bombay to Sind, Madras, Goa, Kattywar, &c. Adding the foreign exports to the coastwise exports and deducting the total of the imports, we learn that Madras erys.

which may Bengal and i'

the imports exceed the exports, in the former by 313,000 gallons and in the latter by 1,125,572 gallons. By these amounts the local production did not equal the consumption plus the internal trade from these presidencies. Cocca-not oil is thus a speciality of Madras trade.

### COPRA OR DRIED KERNEL

COPRA. 1587

A very imperfect idea of the supply and demand for this oil would, however, be conveyed were we to omit to examine in this place the trade in copra or dried kernel, the substance from which the oil is expressed. This is largely exported to foreign countries and sent from one province of India to another to be locally made into oil.

			188.	1-85.	183	5-86.	1886-87.		
Imports Exports	:	:	Cwt. 39,653 64,323	2 3,95,685 5,34,291	Cwt. 105,296 21,755	R 10,20,841 1,86,800	Cwt. 125,222 9,337	# 11,76,799 79,836	

The imports come chiefly from Ceylon and the Straits Settlements, and amost exclusively delivered in Bengal and Bombay, only very small amounts being received by Madras. The exports, on the other hand, go

347.25 cwt., valued at R35.31.115, and the exports 236.250 cwt., valued at R23.00.953. Of the imports, Bombay received 219, 204 cwt., Bengal 26, 297 cwt., Sind 34,658, Madras 27,025 cwt. Of the exports, Madras sent to other Indian ports 182,500 cwt. Bombay 32,205 cwt. Bengal exporting

OIL CAKE, 1588

inland. It is also largely used to fatten fowls, pigs, cows, and other

C. 1588

COCOS nucifera.

The Cocoa-unt Palmt Its Oil,

DIL

Purther on he adds if at the "Cochin is issuily 201, per ton more than the Ceylim or Coronandel coast article" Dr. Dymock, in his last ed flow of the Vige sife Materia Medica of India, 23341. "The value of occasinate oil in Bombay ranges from Rift to 20 per cast."

The Garities of Kishapur Dutries states that 45h of dired copra yield 26% of old and 18% of oil-cake. This would be about 52% per cent, of oil. Arother writer puts the yield down at 36 per cent. There are so many different modes of preparing the oil that, apart from the possibility of there being superior and interior oil-yielding forms of the plant, it must necessarily be difficult to fix definitely what may be regarded as the yield. It may, however, be accepted as somewhere between 30 to 50 per cent. Hawkes states that each tree is calculated to yield at least 24 gallous of oil per annum, and the coir obtained from the nuts is estimated to yield one fourth of the value of the oil, whilst the oil-cake is very valuable for cattle as manure." It will be observed the idea seems to be conveyed in the above privage that the coir from the ripe or copra-yielding nut is of value. No other writer appears to support this opinion.

Royle says that 2 quarts of oil may be expressed from 14 to 15 cocoanuts. Spons Encyclopadia states that in the ordinary country oil-mill 180h of copm will yield so quarts of oil, and that about 40 nuts are required to yield a gallon of oil. The trees grown on still murshes are stated to yield

much less oil than those grown on mixed sandy and loamy soils,

1586

### TRADE IN COCCA-NUT OIL.

Royle remarks that the imports into Great Britain of cocoa-nut oil were in 1850, 98,039 cwt., of which India furnished 85,096 cwt. Hawkes states: "The average annual quantity exported from the Madras Presidency from 1850-51 to 1854-55 is about 1,410,963 gallons. Of this by far the largest proportion is sent to the United Kingdom and France, the remainder finding its way to Arabia, Mauritius, Bombay, and the French (Indian) ports." In 1850, as in the present day, the cocoa-nut oil trade almost entirely centred in Madras, so that the above passages may be taken as approximately indicating the extent of the foreign demand for the oil forty years ago. In 1880-81 the foreign exports amounted to 1,888,122 grillons valued at R20,90,797, Madras alone having shipped to foreign countries 1,690,520 gallons, and sent in addition by coasting trade to other Indian ports 1,493,756 gallons. In 1886 87 the exports were 1,099,864 gallons valued at R13,24,589, and the imports 556,562 gailons valued at R7,54.515 The bulk of the exports (vis., 689,087 gallons) went to the United Kingdom, Madras alone shipping 1,090,480 gallons of the total exports. The imports were mainly from Ceylon (438.144 gallons), Bengal taking by far the largest proportion of these imports (ms. 330.437 gallons). If to these facts an abstract of the coasting traffic be added, some idea of the present position of the cocoa-nut oil trade mry be had. The imports coastwise were last year 1,507,485 gallons valued at R20,60,607; the exports were 1,942,809 valued at R20,74455. These were the amounts of the oil that went to and from the various ports of India; but the full meaning of these figures will be brought out by griing some of the particulars of this exchange Of the imports, Bombay received 794,577, Burma 338,056, Bengal 131,463 gallons, and these quantities were almost entirely obtained from Madras Cochin sent to Bombay 15,789 gallons and to Madras 13,188 gallons. The other items to make up the total coastwise imports were unimportant Local production added to these imports would constitute the supply from which the exports could be made, and in the case of Madras it is noteworthy that that presidency imported

	77
The Cocoa-nut Palm as a Medicine.	COCOS nucifera
nel of the nut. These are known as khobrel, avel, and muthel A fourth	MEDICINE
oil is, however, repeatedly alluded to, namely, an oil prepared from the shell of the nut (see above). This last-mentioned oil is perfectly distinct from the oil of the kernel and is used only in the treatment of ringworm. Its	Shell-011.
to the shell by the mhabitants of other parts of the world besides India, although they do not apparently distil the oil from it. But of the kernel oils used medicinally, the most conflicting statements have been published both as to their action and mode of preparation. Thus, "A very cheap, hard, white sorp is prepared from the oil, austable for pharmaceutical purposes, such as plaster-making and the preparation of soap timment." (Dy mock) The Pharmacepera, on the other hand, says this oil is inferior to ground-mut oil and secanium oil as a vehicle for medicinal purposes by boiling the milk of the ripe corea nut. It is used	
and the second of the second	
,	
perties of the oil are discussed in the United States Dispensatory. In Germany it has been used in pharmacy, to a considerable extent, as a substitute for lard, to which, according to Petten Kofer, it is preferable on account of its less tendency to rancidity, its more ready absorption when rubbed on the surface of the body, and its less liability to produce chemical changes in the substance with which it is associated. Thus the ointimer's desired in the substance with which it is associated. Thus the ointimer's desired in the substance with which it is associated.	
preparé water,	-60-
externs part of coconnut oil, prepared in London, and, under the name of coco- olein, used, instead of the oil itself, as a substitute for cod-liver oil. The	
ly different properties    I his fact might almost be supposed to be in consequence of chemically different oils being isolated    Or Dymook says of the so-called muthel oil "In the Konkan the oil which separates from the freshly-rasped kernel, alone or mixed with tamarind-seed oil, is used under the name of mutel as an application to burns and rheumatic swell-support of the separation o	1602
much used as a local f har after fevers and debilishing rand as a vermfuge in Januare. with a little sugar, in flux. An enimisal of the on and kernel is prescribed in coughs.  C. 1602	

COCOS nucifera

# The Cocoa-nat Palm as a Medicine.

MEDICINE Fruit. 1580 Floners. 1500

ŏï. ISOI Spike. ISO2 1503 Water.

1595

1504 Laible Pulp

> Shell 1500

1507

DIL 1598

>frining It is sometimes experted to Europe. In Madras it sells for 3 to 4 mounds (of 25th) per rupee

## MEDICINE.

The arrest nut is given as a refrigerant, the Planers as an asfringent, and the ost emplised as a substitute for cod-liner oil. The milk of the nut, the juice from the FLOWFFING SPIKE, and the tomentum from the LTAVES are all used medicinally

WATER OR WILL PROM THE GREEN NUT -"The WATER (or milk) of the unripe fruit is described as a fine-flat oured, cooling, refrigerant drink, useful " or and urinary disorders" (U C Dutt) It may be drunk to

To and is considered by the native doctors It is commonly behaved in Bengal, however, that too muc . . . k induces a hydrocele swelling of the scrotum.

the Loidle Pule and the Milk prepared therefrom .- The

ruce of the young fruit is nourishing, cooling, and diuretic. The pulp of the ripe fruit is hard and indigertible but is used for medicinal purposes Ainslie says "By scraping down the ripe kernel of the cocon nut and adding a little water to it, a white fluid is obtained by pressure, which very much resembles the milk in taste and may be used as a substitute for it." "Dr Shortt reports having successfully employed the fresh mik-t, the FXPRESSED JUICE of the grated kernel-in dibility, incipient phthisis, and cachetic affections, in doses of from 4 to 8 ounces twice or thrice daily *- + 1 stc. and may be used as an excellent substitute for cow's antageously administered even to children

in some cases actively purgative, s a substitute for castor oil and other

The following is a prescription known in Hindu medicine as Narikela "Take of the pounded pulp of cocoa nut half a seer, fry it in 8 tolds of clarified butter, and afterwards boil in 4 seers of cocoa nut water till reduced to a strupy consistence. Now add commer long pepper, bamboo manna, cumin seeds nigella seeds cardamoms, cumamon teta patra, the tubers of Cyperus rotundus (mustake) and the flowers of Mesna ferrea (naga kesara) i tola, each in fine powder, and prepare a confection, Dose 2 to 4 to 4s in dyspepsia and consumption " (U C Dutt, Hind Mat Med , 248 )

THE SHELL -" The cleared SHELL of the nut or portions of it are burnt The fluid which is de in a fire, and while red hot, covered by a stone cup posited in the interior of the cup is rubefacient, and is an effectual domes the Thana District allules to this in the following words "The shell when burnt yields an oil which is used as neure for ringuorm" in the Antiles, the cocoa nut is the popular remedy for tapeworm, and its efficacy has been conclusively demonstrated by medical menin Senegal A cocoa nut is opened and the almond extracted and scraped. Three hours after its The worm is expelled in administration a dose of castor oil is given In nine cases in which this remedy was tried two hours afterwards by a surgeon in Senegal the result was complete -Notal Mercury (Trop Agri , 1882-83)

IHE OIL -A reference to the account given of the ord nary oil in another page will reveal the fact that there are three or four oils obruned from the cocon-nut, or rather three or four methods of preparing oil from it which seem to give to the substance different properties district, for example, three oils are prepared from the edible portion or ker-

1607 Nuts. 1608 Roots.

1600

Ashes, IÓOI

Bud.

IÓII

### COCOS The Cocoa-nut Palm as a Medicine. nucifera. THE PLOWERS.-Are sometimes used medicinally, being said to be MEDICINE. Flowers. astringent, vases" (U. C. Dutt, 248) It is also employed as an astringent gargle in sore-throat. THE ASHES .- "The ASHES of the leaves contain an amount of potash; they are used medicin'illy." THE BUD -The tender buds of this palm, as also of Borassus and Phoenix, are esteemed as a nourishing, strengthening, and agreeable vegetable. Special Opinions .- § "The husk of the fruit of the Cocos nucifera is used in the treatment c of male fern when tak W Nolan, M.D , Bomba acidity and gastric irritati ed as a local application BA, M.B, Monghyr). eczema of the scrotum. ing is a popular dome-7, 1st Madras Cavalry, Bangalore). iell, and is used in itch and other R. Thomson, M.D., CIE. Madras) ontaining albumen and salines It is a good drink in cholera cases It succeeds in checking vomiting when other means fail Cocoa-nut oil, prepared from fresh pulp, is a good substitute for cod-liver oil The dose I give is from 20 to 30 ---- the barrens - arten whenchen the daily. An ash is prep is a valuable ant-acid sneet extract is also (Civil Surgeon R. L D from this palm is very refreshing and possesses laxative properties continued use (twice or thrice weekly) during pregnancy has a marked effect on the colour of the infant, which is born of a fair complexion, -: e, f of dock morane ----of the skin It improves the general health like cod-liver oil" (Assistant) Surgeon Shib Chunder Bhattacharji, in Citil Medical charge, Chanda, Central Provinces) "The ator anto - 1 - 1 - 1 - 1 - 1 and soothing" (C

nut (Narikel khon of chronic hearth Anund Chunder Mukery, Noakhalli) "The oil is extensively used to fatten and is orgen for philips " (C · Lionel Beech, Cocanada). ery much used here" (Civil Sur The oil promotes the growth of oil is considered to increase the growth of hair and render it black (A Civil Surgeon) "If the flowers are mixed with sugar, the root of khus-khus, and white chandan, with a little water, the combination will be found good in bilious fever, will check vomiting, and produce a cooling

cocos The Cocoa-rat Palm as a Medicine. nucifera REDICINE and pulmenary diseases penerally. Found the kernel with water, place it to settle, and skim oil the cream. His is preferable to the expressed 1607 "Coxes not of was proposed by the late Dr. Theophilus Thomp-200 (Pr. red. of Koyal Swiety, 1834, 14, 111, p. 41) as a substitute for civil-fiver only and in this character it has been favourably noticed by Dr. J. H Warren (B s'on Mal and Surg. Jouen , Vol. Ill', p. 377) and effect. The substance used in these exict was not the ordinary commercial oil, but the o'cine obtained by pressure from the crude oil fin the so'nd state it is met with in England), refined by being treated with alkalies, and then repeatedly washed with distilled water. In his Lethsomian Lectures Dr. Thompson gives the result of his treatment with this

> Drs. Van Someren and Oswald, and Mr J Wood ' (Pharmacopasa of Indea 1 Or Dymock says encount oil has been tried in Furone as a substitute for cod liver oil, "but its indigestibility is a great drawback to its general use" Drury observes "its prolonged use, however, is attended with disadvantage, inasmuch as it is apt to disturb the digestive organs and induce diarrhoea" May it not be that the untraourable opinions formed by some writers regarding this medicinal oil proceed from the fact that nearly every author describes a different mode of preparing it and consequently that it is possible many different substances or a substance in many stages of purity or impurity may have been experimented with? In the Maldives cocon nut oil is esteemed a powerful antidote

agent in 53 cases of phthisis. Of the first 30, 19 were much benefited, in 5 the disease remained statemary, and in the remaining 6 the disease continued to advance Of the second 23, 15 were materially benefited, 3 remaining stationary, and 5 became worse. Dr. Garrod (Brit and For Med Chir Rev , Jan 1856) has shown that it exercises a marked influence, almost equal to cod liver oil, in increasing the weight of the body great advantage of its employment experienced by Dr Thompson, Dr Garrod, and also by the Edisor, who instituted some trials with it, is, that under its prolonged use it is apt to indice disturbance of the digestive organs and diarrhers. Its use is favourably noticed in the Report of

against the bite of poisonous reptiles

THE JUICE -The freshly-drawn JUICE is considered refrigerant and diurctic, and is valuable as a preparation known as foldly poulties (see also under Borassus, B 677). The fermented juice constitutes one of the spirituous liquous described by the ancient writers. "A tumbleful of the fresh juice is sometimes taken early in the morning on account of its

refrigerant and slightly aperient properties." (Dymock)
Scrapinos of the Husk—"The outside scrapings of the mosk and branches applied to ulcers will cleanse and heal them rapidly if sorked in proof rum, the efficacy of this application has proved by the case of two bad ulcers occasioned by the bite of a negro's teeth. The Joung roots boiled with ginger and salt are efficacious in fevers, the same

as the bamboo' (Royle)

THE COTTON OR TOMENTUM -"This is a soft, downy, light-browncoloured substance, found on the outside of the lower part of the branches of the cocoa-nut tree where they spring from the stem, and are partially covered with what is called panaday, or coarse vegetable maiting of the The COCOA-NUT COTTON is used by the Indians for stopping blood, in cases of wounds, brusses, leech-bites, &c. for which purposes 1115 admirably fitted by its peculiar texture? (Annie, Mat Ind.) (Compare with tomentum of Caryota urens and of Borassus, B. 680 See also under Trute. under Tinder )

Tomentum ZÓNÓ

Juico.

1604

Husk.

1605

#### The Cocoa-nut Palm: Its Edible Products.

COCOS nucifera.

1,434,821, and East Africa 627,346 Of these imports Bengal took 1,434,521, and East N1,75,552, Burma 5,618,949, valued at R3,72,702, 8430,229, valued at R1,75,552, Burma 5,618,949, valued at R3,72,702, Bombay and Madras each received 700,000, and Sind 86,800 Bengal TRADE IN NUTS

Maldives being viewed as foreign territory (while the Laccadives and -th . f --- 1t is notemeeting the kson's paper

of the British uts are eaten

or made into confectionery, he continues "Cocoa-nuts are largely used

and bakers, though the Ceylon run them close.

Indian - The coastwise trade or interprovincial exchange is, however, very important The total imports from one port to another were last year

2 4

Of the coastwise exports in 1886-87 Bengal sent to Burma, according o another an ports. Madras Bombay,

o Butma, and 2.501.475 to Cutch Burma exports no cocoa-nuts, but it seems probable that some of its imports, which appear as from Bengal, may be from

the Nicobar Islands These islands being associated in trade returns with Bengal, direct exports may occasionally not appear as exports from Bengal, hence, in all probability, the disparity in the figures of imports into Burma alluded to above

## JUICE FROM THE COCOS-NUT

JUICE. Madras. 1020

Dr. Hugh Cleghorn has described as follows the process of tapping the palm for its juice in Madras—a process which is essentially that followed in Bombay and other parts of the country: this palm is not tapped in Bengal. When the spathe is a month old, the flower-bud is considered sufficiently juicy to yield a fair return to the (Sanar) toddy-drawer, who accends the tree with surprising ease and apparent security, furnished with the apparatus of his socation. A year's practice is requisite I efore the Sinar becomes an expert climber. The spathe when ready for tapping is 2 feet long and 3 inches thick. It is rightly bound with strips of voung leaves to present expansion, and the point is cut off transversely to the extent of one inch. He gently harmones the cut end of the spathe to crush the flowers thereby exposed and to de ermine the sap to the wounded part, that the juke may flow freely. The stump is then bound up with a broad strip of fibre. His process

cocos nucifera,

The Cocoa-nut Palm: Toddy.

JUICE

is repeated morning and evening for a number of days, a thin layer being shaved off on each occasion, and the spathe at the same time trained to bend downwards. The time required for this limitatory process varies from five to fifteen days in different places. The time when the spathe is ready to yield toddy is correctly ascertained by the chattering of birds. the crowding of insects, the dropping of Juice, and other signs unmistakeable to the Sinar The end of the spathe is then fixed into an earthen vessel called kudace, and a slip of leaf is pricked into the flower to catch the coming liquor and convey the drops clear into the vessel. When the truce begins to flow the hammering is discontinued. A single spathe will continue to yield toddy for about a month, during which time the Sanar mounts the tree twice a day and empties the juice into his eropeity (a vessel made of closely-platted palmy ra fibre), and repeats the process mentioned above of binding and cutting the spathe an inch lower down, and inserting its extremity into the kudave. The flow is less during the heat of the day than at night. One man will thus attend to 30 or 40 trees Forty trees will yield about 12 Madras measures (11 to 2 gallons) of juice-7 measures in the morning and 5 in the evening. This is at the rate of about a quarter of a measure per tree. The length of time a tree will continue to yield varies from six months to a year in very favourable soil, But it is not considered prudent to draw all the juice one can from a tree, as it will then become barren all the sooner Dr Shortt says the quantity of sap a tree will yield saries according to locality and the age of the spathe; 3 to 4 quarts is the average quantity obtained in 24 hours for a fortnight or three weeks "Sometimes this fluid is converted into what is termed nera by lime-washing the vessels that collect the fluid in order to neutralise the andity. It is then sold as a sweet and refreshing drink in the bazaars" "Toddy," he proceeds to say, "is also boiled down into a coarse kind of sugar called jaggery, which is converted into molasses for the manufacture of spirits, or refined into white or brown sugar before fermentation sets in

Bombay, 1621 In Bombay the cocon-nut plain is tapped for its juice in Ratindgiri (Gas, X, 34), in Koldbi (XI, 28), in Khindesh (XII, 321), in Thana (XIII, Part I, 295), and in Khana (XIV, Part I, 36, Part II, 295). According to the returns the writer has had access to, there are some 3\(\frac{1}{2}\) million trees in Bombay, of which about 30,000 at 40,000 are tapped for their juice

The following abstract from the Kolaba and Rainagers Gasetteers may be accepted as fairly representing the process of tapping pursued in Bombay, the yield, rent paid, return and profit being there shown The cocoa nut gardens are generally owned by Hindus, who let the trees to rich Bhandaris, who agree to supply the owner of the liquor shops with formented or distilled juice From the very earliest times cocoa-nut trees have been taxed, a distinction being made between trees kept for fruit and those set apart to be tapped In the Ratnagur district, it is stated, toddy trees let at from 2r to 6r (R1 to R3) a year In addition to rent, a Government tax on trees tapped has to be paid. The maximum leviable rate was in Malabar and Deogad 21d (s anna 8 pie) a month or 2s 6d (R11) a year on each tree tapped Under the new system a special license is granted to tap trees, at a fixed rate for each tree, and under certain conditions as to the number of trees included in the license The licensees are allowed to sell toddy by retail at the foot of the trees, but not to distil, the latter privilege being vested exclusively in the licensed shop-keepers for the sale of country spirit In Kolaba, it is said, the crude juice of fifteen trees costs the Bhandari about £1 21 (R11) a month or 15 6d (12 annas) per each tree Besides the wages of the distiller and cost of fuel the Bhandari has to make good to the liquor-shop keeper part of the tap-

1624

TARI.

1625

#### COCOS The Cocoa-nat Palm: Toddy. nucifera. JUICE. ping tax he had paid to Government. Government levies from the liquor shop keepers £60 (R600) a year for every hundred trees tapped. Three fourths of this the liquor-shop keeper pays; the remaining fourth he recovers from the Bhandari who supplies the liquor. The Bhandari's share of the tax amounts to £15 (R150) on one hundred trees for one year,-that is, a monthly charge of £1-5s. (R121) on the one hundred trees, or on each tree a monthly tax of 3d. (2 annas). In Ratnagiri the yield is said to vary from 35 to 64 imperial gallons from each tree. In K. 121erage 41 pints (12 seers) of juice a d The juice is seldom sold raw; mos and sold by him to the liquor-shop accept, with the wages of an assistant the monthly charge for distilling the produce of one tree is about 2d. (1) ert jurig with Constitution, tapping, distante, &c., the Bhandars pays about 2s. 5d. (R1-3-3) for the produce of each palm. Allowing for loss by estimating, instead of 53, only 5 gallons, and he obtains 3s. (Rt-8) for the spirit prepared from each palm. This leaves him a net Spirit profit of 7d. (41 annas) on each tree, and if he possesses a plantation of 300 trees he makes a fairly good income. Of Ratnagiri, it is said, there are ordinarily three kinds of palm spirit, Rasi. known respectively as rasi, phal or dharti, and pheni; rasi being the 1622 -s a still stronger spirit Phul. 1623 · sholesale rates at which for the imperial gallon, Pheni.

and spains are unsured in private stills, heened to be kept at certain Bhandáris' houses under fixed conditions as required, in proportion to the number of trees licensed to be tapped in the weimity. One still is usually allowed for every 100 trees, and the still-pot is limited to a capacity of 20 callons.

# FERMENTED AND UNTERMENTED BEVERAGE.

This is one of the forms of the so-called palm-wine so much extolled by the early European visitors to India. From what has been said in the preceding pages regarding the juice it may have been inferred that, if left for a short time after removal from the tree, it rapidly ferments and becomes intoxicating. This is the tari or toddy for in the case of the cocoa-nut more specifically known as the nira), a beverage very extensively consumed in India. Fermentation is said to be prevented by the addition of a little lime to the fluid. The earthen vessels into which it drains are generally powdered with hime when the fluid is to be drunk in its fresh unfermented state, or is intended to be boiled down to sugar or It is also drawn early in the morning instead of being left on the tree overday. Robinson says of the Laceadive islanders that "they are still so strict in the abstinence from all fermented liquors, that the manufacture of toddy would not be tolerated in the islands." fermented toddy is extensively used by the bakers in India in place of yeast. When fermented the juice may be distilled into spirits or made into vinegar. One hundred gallons of tare yields on an average twertyfive of arak by distillation.

7 pie), phul 1r. 11d. (8

cocos nucifera.

# The Cocoa-nut Palm: Toddy.

JUICE.

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scring its exact.

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In Rainagers the yield is stud to vary from 35 to 61 imperial gallons from each tree. In Rolâba a tree is stud to yield on an average 44 pints (11 seers) of junce a day, or 101 imperial gallons a month. The junce is seldom sold raw most of it is distilled by the Bhandári and sold by him to the liquor-shop keeper. With the wages of an assistant the monthly charge for distilling the produce of one tree is about 2d (the state of the	
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Of Ratingers, it is said, there are ordinately three kinds of palm spirit, known respectively as vias, phil or dharts, and phens: ras being the weakest and phens the strongest. In some places a still stronger spirit called dirtass is manufactured. The average wholesale rates at which the farmers buy stock from the manufacturers are for the impental gallon, tads at d (1 anna 10 pie) rats 81d (5 annas 7 p.c), phil 1s 1td (6 annas 9 pie), phil 2s 0dd, (Rt. 64). The spirits are distilled in private stills, heensed to be kept at certain Bhandáris' houses under fixed cond tions as required, in proportion to the number of trees heensed to be tapped in the vicinity. One still is usually allowed for every 100 trees, and the still pot is limited to a capacity of 20 gallons	Rasi, 1622 Phut 1623 Phent 1624
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preceding page

COCOS nucifera.

The Cocoa-nut Palm: Sugar.

PALM SUGAR

#### PALM SUGAR

Instead of being fermented, the liquor may be evaporated down and its sugar thus extracted "Light gallons of sweet toddy, boiled over a slow fire, yield 2 gallons of a lusciously-sweet liquid, which is called jaggery or sugar-water, which quantity being again boiled, the coarse brown sugar critical paggery is produced. The immps of this are separately tied up in dried banana leaves "(Royle) Dr. Shortt says: "The sap is poured into large pots over an oven, beneath which a strong woodfire is kept burning, the dead fronds and other refuse of the plants being used as fuel. The san soon assumes a dark brown semi-viscid mass, well known as jaggery or gur, which whilst warm is poured into earthen pots or pans for preservation. Ten to twelve seers of the san yield one of jaggery . the value of a maund of this jaggery is about 2 rupees In this state it is sold to abkari contractors, sugar refiners, or merchants. The sugar refined comprises several sorts, known in the market as moist, raw, coarse, and fine sugar. The juggery is placed in baskets and allowed to drain, the watery portion or molasses dropping into a pan placed below. This is repeated, so that the jaggery or sugar becomes comparatively white and free from molasses. This sugar—for soit may now be called is put out to dry, and the lumps broken up, when dry it is termed raw sugar, and weighs about 25 per cent of the whole mass, the rest of it being collected in the form of molasses" Thus cocoa-nut sugar is chiefly met with in the form of jaggery. It is well known, however, that it is capable of being refined according to European principles, and a certain amount of cocoa nut sugar is regularly prepared "The success of Dr J N Fonseca (author of the History of Goa) in converting toddy of the coccoa-nut tree into crystallized sugar, has been hailed with satisfaction by the press at Goa, and flattering calculations are made of the advantages that will accrue to the country from the development of this new industry." (Bombay Gasette) A similar sugar is prepared from the date-palm, from the palmyra-palm, and from the Indian sago-palm (Caryota urens) The date palm is very largely used for this purpose in Bengal, and the cocoa nut and palmyra palms in Madras, while in Bombay, apparently, sugar is only very occasionally made from the juices of these trees, but when extracted it is most generally prepared from the palmyra or Caryota palms Some years ago the Government of Bombay, getting alarmed at the growth of the habit of toudy-drinking, brought Jessore sugar manufacturers to try the experiment of preparing sugar from the date-palms of the western presidency. According to the returns of the Surat district there are in that district alone 1,195,901 date-palm trees, of which 489 395 were tapped in 1867-68 it was found that the returns from sugar manufacture were so poor, as compared to the profits from the sale of tars, that the experiment practically failed It is not known whether or not sugar to any appreciable extent is actually prepared from the Bombay prims, nor even whether a license is necessary to tap trees for sap intended to be so used. Of the Thana district it is said "Coarse sugar or gul is also made by boiling the juice in an earthen pot over a slow fire" It is worth recording that, according to the Gazetteers, there are 3,500,000 tocoa-nut trees in Bombay, of which 50,000 are regularly heensed. Of palmyra palms there are said to be 47,810 trees in Surat alone, of which 16,739 are regularly tapped Carjota palms there are 70,000 trees, of which about 20,000 are tapped, 48,900 of these occur in Kanara, 21,672 in Kolaba, and the remainder ın Ratnagırı

In a recent report on the trade in Indian sugar issued by the Revenue and Agricultural Department, no mention is made of palm sugar being

С. 1626

Refined 1626 The Cocoa-nut Palm: Sugar.

cocos nucifera.

prepared in Bombay, so that it may be inferred the trees licensed to be PALM SUGAR.

	•		•		•					•	
											•
											Acres.
Palm	712										24,900
Coco	a nut						•		٠		5,700
Date		•	•	•	•	•	•	•	•	•	1,600
											32,200

The writer of that report adds: "In 1884-85 and 1885-86 the area under cocoanut, date palms, and palmyras was 31,000 acres and 29,000 acres

palm. Taking the customary estimate of 100 trees to the acre, we arrive at the conclusion that out of a total of 7,776,500 trees, 570,000 were tapped, or perhaps only tapped for sugar, others being tapped for toddy. There exists in all the works and reports the writer has been able to consult the greatest possible confusion as to whether or not the trees may be tapped for sugar without paying the license lexical on the tappings made with the view to the preparation of the beverage. It would be instructive to know if the 5,700 acres of coccanuts in the above statement of Madras are exclusively set apart for sugar, and are independent of the trees spoken of in excise reports as beensed for the preparation of toddy, it might fairly be inferred that the failure to develope a palm-sugar industry proceeded to some extent from that fact. But there are many other difficulties to the creation of a large trade in palm sugar. In this reservet the following passage will be found instructive.

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From time immemorial (sie) the natives of Ce) on have known unce of the cocoaof a letter from the information as to

palms for sugarter, receiving considerable assistance who, when we last heard of him, was it occasion he sent us a quantity of

cial principles. An experiment might be tried, however, labour being economised by the use of ladders, perhaps, and a larger use than the natives make in toddy drawing, of safe passages from tree to tree," (Tropical Agriculturis, 1881-83, 563.)

De Candolle, quoting from Seeman, says, upon a rock near Point de Galle
may be seen "the figure of a native prince, Kotah Roya, to whom is attributed the
discovery of the uses of the occoa-nut, unknown before him, and the earliest chronicle
of Ceylon, the Maramana, does not mention this tree, although it carefully reports
the fruits imported by different princes."

cocos nucifera.

The Cocca-nut Palm: Sugar.

PALM SUGAR

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### The Cocoa-rat Pa'mt Speat.

COCOS nucifera.

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			•			•			•	
										Acres
Pa1m	372 .									21/77
Car	i rul .								•	(,~*)
Date		•	•	•	•	•	•	•	•	I/m
										12-70

The writer of that report adds : "In 1504-55 and 1505-65 the area under cassanut, date palme, and palmyras was given acres and 2° cross acres tespectively, and the cultum 2260 labbs mained and 1006 labbs mained. The traj quaritie of laggery produce of tirm grounds. Ac., is apparenth more than that cleaned from sugar-cane." In a special rep it on the cocos not resurd by the Reserve and Agricultural Department in 1500 it was estimated that there were 7,7765 acres under that palm. Taking the customary estimate of too trees to the acre, we arrive at the conclusion that out of a total of 7.756 500 trees, 570,000 were tapped, or perlaps only tapped for sugar, others being tapped for toddy. There exists in all the works and reports the writer has been able to confull the greatest possil'e confusion as to whether or not the trees may be tapped for sugar without paying the license lested on the tappings made with the view to the preparation of the beverage. It would be instructive to know if the \$700 acres of coons nuts in the above statement of Madras are exclusively set apart for sugar, and are independent of the trees speken of in excise reports as beenied for the preparation of toddy, If every tree tapped I as to pay the beary tax imposed on the preparation of the foldy, it might fairly be inferred that the folure to develope a palmsugar industry proceeded to some extent from that fact. But there are many other difficulties to the creation of a large trade in palm supar.

In this respect the following passage will be found instructive:"I rom time immemorial (iic) the natives of Ceston have known." low to produce crystallized sugar from the inspirated juice of the cocoanut spathe. About thirts years ago, in consequence of a letter from the Inte Mr J Glanville Taylor, of Batticaloa, asking for information as to the probable success of attempting to utilize cocoa nut palms for sugarmaking, we went fully into the matter, receiving considerable assistance from Mr. D O Amesekere, a proctor who, when we last heard of him, was practising at Kurunegala. On that occasion he sent us a quantity of and all and angene a sample man which has a an

scale will not pay Europeans when the matter is entered into on commercial principles. An experiment might be tried, however, labour being economised by the use of Indders, perhaps, and a larger use than the natives make in toddy drawing, of safe passages from tree to tree." (Tropical Agriculturist, 1881-82, 563)

e the Candalla

COCOS nucifera, CEMENT. 1027

The Cocoa-nat Palm : Sphit.

# CEMENT MADE OF LINE AND COCCUPET JACOURY.

So often is this subject alluded to that it deserves special notice. The and the second of the second of the t and an I ttrace India, but is ap-" of Bergal. In iis palm sugar y is mixed with chunam for m: rreat beat and to take a fine t he bricklayers in preparing i purest castor oil, a certain in which the seeds are boiled."

In Spons' Encyclopadia there occurs the following regarding Ceylon jaggery: "Amongst a variety of purposes to which it is put is that of being mixed with the white of eggs and with lime from burnt coral or shells. The result is a tenaceous cement, capable of receiving so beautiful a polish that it can only with difficulty be distinguished from the

finest white marble."

This subject appears to be well worthy of chemical investigation, for summ that the property of this ingredient in be employed to replace the garments of whowith opening sentences Dye, C. 1547.)

SPIRIT. 1628

# PALM SPIRIT OR ARAK.

Instead of being consumed as a fermented beverage the palm wine separate record all rest satisfied to be tapped. g the method of

taxation and process of distillation generally pursued. The present notice of cocoa nut spirit may therefore be concluded by the following note kindly furnished for this work :-

"Dr. Lyon, of Bombay, has recorded some interesting details regard-

ighthree hohe

strength attained by the samples; as well as the strength or samples collected during the twelve day-hours, when examined the morning after collection :--

	2			ecci s	PROOF SPIRIT PER CENT.			
					Cocoa-nut	Date- paim.	Brab (Borassus).	
Night samples. 3 hours after collection . 8 haximum strength .	:	:	:	:	7°15 10'0 11'9	5'8 8 o 11'0	3.9 4.7 7.9	
Day samples. 15 hours after collection .				•	10 B	11.7	6.2	

# cocos The Cocoa-nut Palm: Spirit. nucifera. "Dr. Lyon finds that in toddy collected in pots which have previously SPIRIT. been used, fermentation commences before the pots are removed from the tree. The toddy appears to attain its maximum strength within 24 hours after removal from the tree. The volume of toddy yielded is greater during the twelve night than twelve day hours. Comparing trees of the Vinegar from Palm Wine.—Nearly every writer who has dealt with the subject of the useful good of the access to the subject of the second of th VINEGAR. 1620 tillation, it is said, twenty the acetous fermentation being allowed to ferment, man Panaha STRUCTURE OF THE WOOD. TIMBER. 1630 Outer wood close-grained, hard, and heavy. Vascular bundles black deal a sale alocale monted a sh possesses great elasticity, and is for this reason particularly well adapted for temporary stockades which are exposed to cannon-shot." DOMESTIC SACRED USES. DOMESTIC. 1631 So many of these have already been alluded to that it is scarcely necessary to attempt to enumerate the thousand and one uses to which the palm is put by the people of India. Under sugar or jaggery on the opesting uses of the This art is much being much adsally used as the Hukah water-bowl of their smoking-pipes or hukah. In Madras these shells are Rowle.

a graphic account of the manner in which the cocoa-nut enters into the every-day life of the people of the tropics:—
Dickens in Household Words says: "To a native of Ceylon the

C. 1636

cocos nucifera.

The Cocoa-nut Palm: Domestic Appliances.

DOMESTIC

cocoa-nut palm calls up a wide range of ideas, it associates itself with nearly every want and convenience of his life. It might tempt him to assert that if he were placed upon the earth with nothing else whatever to minister to his necessities than the cocoa-nut tree, he could pass his existence in happiness and content. When the Cingalese villager has felled one of these trees after it has ceased bearing (say in its seventieth year), with its trunk he builds his hut and his bullock-stall, which he thatches with its leaves. His bolts and bars are slips of the bark, by which he also suspends the small shelf which holds the stock of homemade utensils and vessels. He fences his little plot of chillies, tobacco, and fine grain with the leaf-stalks The infant is suring to sleep in a rude net of coir string made from the husk of the fruit, its meal of rice and scraped cocoa-nut is boiled over a fire of cocoa nut shells and husks, and is eaten off a dish formed of the planted green leaves of the tree with a spoon cut out of the nut-shell When he goes a fishing by torch-light, his net is of cocoa-nut fibre, the torch, or chule, is a bundle of dried cocoa-nut leaves and flower-stalks, the little canoe is a trunk of the cocoa palm tree, He carries home his net and his string of hollowed by his own hands fish on a yoke, or pings, formed of a cocoa nut stalk. When he is thirsty he drinks of the fresh juice of the young nut, when he is hungry he eats its soft kernel If he has a mind to be merry, he sips a glass of arrack, distilled from the fermented juice of the palm, and dances to music of rude cocoa-nut castanets, if he be weary he qualts 'toddy,' or the unfermented purce, and he flavours his curry with vinegar made from this toddy Should he be sick, his body will be rubbed with cocoa nut oil, he sweetens his coffee with jaggery or cocoa-nut sugar, and softens it with cocoa-nut milk, it is sipped by the light of a lamp constructed from a cocoa-nut shell and fed by cocoa nut oil His doors, his windows, his shelves, his chairs, the water-gutter under the eaves, are all made from the wood of His spoons, his forks, his basins, his mugs, his salt-cellars, his the tree jars, his child's money-box, are all constructed from the shell of the nut Over his couch when born and over his grave when buried, a branch of cocoa-nut blossoms is hung to charm away evil spirits." This is, of course, a European picture some of the illustrations being scarcely in accordance with fact. It is, however, a true picture of the all importance of the "Prince of Palms" to the inhabitants of the tropical regions

In order to convey some idea of the numerous uses of the cocoa-nut palm, the following extract from the Colorial and Indian Exhibition Catalogue may be here reproduced. It is a list of certain articles prepared from the palm, exhibited by Mr M O Pereira, Head Assistant to the

Government Medical Storekeeper, Bombay .-

(1) Coir (Kabal, Katha) -The fibre made of cocoa-nut husk, in this state it is used for stuffing cushions pillows, beds, making rope mats, &c (2) Spoon (Ulki) - Used in the cook-rooms of Europeans, and by the

natives for drinking gruel (rice conjf), has the advantage over

the metallic one of not being corroded (3) Drainer (Zárá) - Used for draining food fried in ghí (clarified butter) or oil

(4) Ladle (Doho) - Used for water.

(5) Ladle, small (Budds) -Used by natives for taking out oil for daily use from an earthen vessel containing the yearly or quarterly stock It is not corroded by the oil

(6) Hubble bubble (Gudguds),...This is the hukah of the poorer classes.

(7) Beads (Mani) (8) Vinegar (Sirka Amti) - Made of the juice (taddy) of the cocon-nut

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The Cocoa-nut Palm: Domestic Appliances.	cocos nucifera.
(9) Pickle (Lonche, Achar) - Made of the pith of the top of the fresh tree	DOMESTIC.
(10)	1
(11) leaf. (12) Broom, Goa (Kersuni, Butará. Zadú) — Made of leaf-ribs, it is much used for sweeping purposes	
(13) Strainer (Mandord) —The sheaths by which the leaves are held firm to the tree. Used for straining cocon-nut juce (toddy) and cocon- nut milk, and for general straining in the cook-room	
(14) Woolly floss (Burá) — Much used as a styptic for cuts by the toddy drawers and cultivators.	
(15) Blossom (Kontf) — The blossom in the state when it is tapped for drawing pince (toddy).	
(16) Chain (Sinki Kargotá).—Used round the waist to retain the loin cloth The size is for a child Set in metal may be used as a watch guard.	
(17) Drum (Dholki) -Made of a piece of the trunk of the cocoa-nut tree	
(18) Wood piece of rafter (Barod Wansa).—Made of the lower part of the tree 10, 20, and 25 feet in length.	l
(19) Oil (Khobrel) —Oil expressed in the native mills for commerce.  (20) Oil (Muthel) —Oil extracted from fresh coccanuts by rasping fine, ands or by dinternally	
results.	ì
(21) F. (22) Liquor (Daru, Rash: Urakh) Spirituous liquor 60° U.P., distilled	
(23) P -	
of the Portuguese. There is no native name for it, and it is only known to the Native Christians of Bombay. Drunk hot for a cold, one or two cupfuls	i
(24) Liquor (Fiendari Port Dobrado) (double)—Liquor made of cocoanut (toddy) nuce by redistillation 20° U.P., formerly much used for making medicinal tinctures and country brandy.	
(25) Cocoa-nut (Várel) — This fruit takes a year to men.	}
(26) Sweetmeat (Nárlipak) —Prepared from the kernel of the nut (27) Sweetmeat —Prepared from the kernel with saffron	l
(28) Splints (Kambi) - Made of (poguy) the spathe of the blossom used for this purpose by the toddy drawers and natives of Goa, &c	}
(29) Door mats.—Made of the fibre of many shapes and sizes by natives and in the jails	
(30) Buggy mats.—Made of the fibre of many shapes and sizes by natives and in the rails.	
(31) Carnage mats.—Made of the fibre of many shapes and sizes by natives and in the jails.	ĺ
(32) Floor mats — Made in Malabar and in the Bombay jails of different sorts and colours.	
(33) Cage (Punjara, Khuri) — Made of the rib of the leaf. (34) Horn (Pipáni Toutora) — Made of the leaf of the palm; gives a loud sound when fresh.	1
(35) Horn, small size (Dhakti Pipáni) — Made of the leaf of the palm,	]
(36) Toy parrot (Papat) — Made by children of the leaf of the palm; when new it looks better.	

## COCOS nucifera

# The Cocoa-nut Palm: Domestic Appliances.

DOMESTIC

cocoa-nut palm calls up a wide range of ideas, it associates itself with nearly every want and convenience of his life. It might tempt him to assert that if he were placed upon the earth with nothing else whatever to minister to his necessities than the cocoa-nut tree, he could pass his existence in happiness and content. When the Cingalese villager has felled one of these trees after it has ceased bearing (say in its seventieth year), with its trunk he builds his hut and his bullock-stall, which he thatches with its leaves. His bolts and bars are slips of the bark, by which he also suspends the small shelf which holds the stock of home-made utensils and versels. He fences his little plot of chilles, tobacco, and fine grain with the leaf-stalks. The infant is swing to sleep in a rude net of coir string made from the husk of the fruit, its meal of nee and scraped cocoa-nut

spoon cut out of the net is of cocoa-nut leaves and flowerhollowed by his or

tilled from the fermented juice of the paim, and dances to music or truck

ht of a lamp constructed from a cocoa-nut His doors, his windows, his shelves, his chairs, th

lars, his been born and over his grave when unition, weanch of coccannut blossoms is hung to charm away evil sprints." This is, of court of the illustrations being searcely in acct

pair Catalogue may be here reproduced. It is a usual cultural M. M. O. Pereira. Head. Assistant to the

husk, in this state ing rope mats, &c. peans, and by the ie advantage over

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or oil

(4) Ladle (Doho) —Used for water.
(5) Ladle, small (Buddi) —Used by natives for taking out oil for daily continuous to the yearly or quarterly stock.

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The Cocoa-nut Palm: Domestic Appliances.	nucifera.
(9) Pickle (Lonche, Achdr) - Made of the pith of the top of the fresh tr	DOMESTIC.
(10)	
(11)	[
(12) leaf-ribs; it	15
are held fit of and cocc	
(14) by the fod	dy
(15) is tapped	for
driwing junce (toldy)  (16) Chain (Sinkti Kargota).—Used round the waist to retain the loin clo  The size is for a child Set in metal may be used as a wate guard.	th :h-
(17) Drum (Dholki) -Made of a piece of the trunk of the cocoa-r	rut )
(18) Wood piece of rafter (Barod Wanss) Made of the lower part	of
the tree 10, 20, and 25 feet in length.  (19) Oil (Khobrel) —Oil expressed in the native mills for commerce,	-
(20) Oil (Mullat) — Oil extracted from fresh space must be seened from	{
(20) Oil (Muthel) —Oil extracted from fresh cocor-nuts by rasping fit drying, and pressing between corr and twisting with hands or	ne, by
	ar. J
(21) · ×	1
	led i
graph of the second of the sec	!
(23) P	
	•
one or two cupfuls.	71
(24) Liquor (Fhendaru Port Dobrado) (double) - Liquor made of coccount (toddy) juice by redistillation 20° U.P.: formerly much its	on- sed
for making medicinal tinctures and country brandy.  (25) Cocoa-nut (\(\lambda eel\)) —This fruit takes a year to open.	1
(26) Sweetmeat (Nárlipak) -Prepared from the kernel of the nut.	}
(27) Sweetmest.—Prepared from the kernel with saffron	- 1
(27) Sweetmeat.—Prepared from the kernel with suffron (28) 5-1-19 (20) 10-1-19 (20) 10-1-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10-19 (20) 10	ed
and in the jans	res
(30) Buggy mats — Made of the fibre of many shapes and sizes natives and in the jails.	by
(31) Carriage mats.—Made of the fibre of many shapes and sizes natives and in the juils	by
(32) Floor mats.—Made in Malabar and in the Bombay jails of different	ent
sorts and colours	
sorts and colours	)
sorts and colours  (33) Cage (Pinjará, Khuri) — Made of the rib of the leaf.  (34) Hota (Pipani Tontora) — Made of the leaf of the palm: gives a lo	ud
(33) Cage (Pinjará, Khuri) — Made of the rib of the leaf.	

450	Dictionary of the Economic									
COCOS nucifera.	The Cocoa-nut Palm : Domestic Appliances.									
DOMESTIC.	(37) Toy parrot in cage (Piniavoit Panat) — Mada L. 1911.  (38) Leaf of the ps (38) Leaf woven, C. houses; has (39) Root (Mai).—Used medicinally, astringent, and as a gargle for sor mouth. (40) Rope (Kath, Sumbha).—This is extensively used. (41) Oi-bottle (Doubla).—Hung beneath the labour-cart with castor oil and									
	(42) '- ingent									
	(43) catch									
	purposes (model).  (44) Conduit Panthh).—A conduit put under the hole of the trough for conveying water for irrigation purposes.  (45) Adapter (Naid).—Piece of the adapter used for connecting the native musical instrument, used by the poorer classes.  (45) Ram (Bāhāl).—Piece of beam of the shape used for houses. It is also used for fishing-stakes in the seat generally two toccoa-nut trees make a stake to to 70 feet long.  (48) Rosary box.—Made of immature cocca-nuts.  (49) Charcal Powder (Kols).—Burnt shell used for preparing black and lead-coloured washes for houses.  (50) Broom (Zāda).—Made of the ribs of the leaf; used by the Bombay is the seat of the leaf of the lea									

Products of India.	459
The Coma-ent Falm : Domestic Appliances.	ODONOFSIS Orata
(5a) Easte (Sil. Chardd, S. dan).—Used as fuel. Especially for backing purposes also affords our fibre.	g DOMESTIC.
(55) Schops.—Made of the shell. The round and deep ones are used a drinking curs.	ıs
(55) Neck belta (Fair).—Used for yoking bullocks and buffalces to care ploughs, oil-mills, &m.	5,
(57) Sack (That? 745) —Used for carding out articles; a correspond similar one is attached to the card for carding stars or grass.	
(5d) Teeth-brushes (Latan).—The perficels of the blossom are used a troth-brushes.	5
(5c) Erashes (Erasha, Kachri).—The pedardes of the blossom are use for whitevashing houses, &m.	₫
(70) Elini (Lal-Lilaban).—Used for blinding bullocks and buffaloes while yoked to the Persian wheel, oil-mill, &c.	ie
(71) Nest (Giarta, Giarta Made by birds out of the fibre of the leaf.	
(72) Som (Sain).—Made of comment oil; has larger percentage of water than any other scap.	=
(73) Familes and tays.—Rings, whips, nextiles, ratiles, crosses, &c.	l .
(74) Eats for clicks.—)lade of the wood (cocos-out).	1
(75) Oil-cales (Fend).—Oil-cake from the nanve mill.	
(76) Fazimar (ship) (Fazzmárs).—Toy made by the boys of the fishermer class.	1
(7) East, fishing (Holis).—Toy made by the boys of the fishermen class	-1
(76) Kernel (Khabre) - Dry kernel	1

(79) Stem (Frenter) —Used as broom. (30) Charpai, Cot (Khát, Edj).—Used by the natives (model).

(II) Futash (crade) (Auir). The ash of the stem of the leaves; they produce an per cent. of ash.

(in) Comment, abortive (Vánni Nárel, Vánil).—Used as floats for beginners in swimming.

(3) Scadin.—The spadin prepared for drawing June (tadly). A thin since is out from the galm sum three times a day. The june flows from this and dups down into an earthen pot suspended on purpose. A small piece of the leaf is fixed above to prevent the bottom of the put from touching the point, the sheath of the leaf covering the mouth of the pot to keep out fles.

Ccclia-A commercial term for the refuse separated on cleaning herep or flax fibres.

1537

# CODONOPSIS, Wall; Gen FL, II., 557-

It. 60. fig. 3 : CANTANGLACIE Coccessis evala, Earli, F. Er. Inl., III., 433; Rayle, Il., 253,

Ver-Lille

Habitat. A be-baceous plant corumon in the N. W. Himilays from Kashmir to Gorbwil at altitudes from 8,000 to 12,000 feet, distributed inti Aghánistán.

Meanine Atchison (Karan Valley Flora, in Linn Soc. Four., ATL., ray says - The rocts and leaves of Codonnesis are made into poultices and employed in the treatment of bruses, alcers, and wounds."

Food The large ton-root is ground into flour and eaten in Laboul" (Stemart; dilabition). In Karam e is said to be eaten raw or cooked.

**E**DICESZ **1539** 

1635

FCCE_ 1540

C. 1640

458

# cocos The Cocca-nut Palm : Domestic Appliance's. nucifera. DOMESTIC. (37) Toy parrot in cage (Pinjarydt Popat) .- Made by children from the leaf of th (38) Leaf wore houses: (39) Root (Mal. -- 1 . . . (40) Rope (Káthá, Sumbha).-This is extensively used. (42) children are fond of it. (43) Trough (Panshira).-Trough made of cocoa-nut tree, used for catching water drawn from a well with a Persian wheel for irrigation purposes (model). (44) Conduit (Panhal) .- A conduit put under the hole of the trough for conveying water for irrigation purposes. (45) Adapter (Nala) .- Piece of the adapter used for connecting the native the poorer classes, ed for houses. It is also used for fishing-stakes in the sea; generally two cocon-nut trees make a stake 60 to 70 feet long. (48) Rosary box .- Made of immature cocoa-nuts. (49) Charcoal Powder (Kolsd).—Burnt shell used for preparing black and ' ımbay (50) ... : used fields. (52)(54) (55) (56) (57) (58) Tar with acetic acid (Kartel) .- Made by burning the shells in a pot with a small hole in the bottom, placed on another, heated by fire on all sides. Used by the natives for ringworm and skin diseases. (59) Rope (Dore) .- Made of various sorts and sizes. (60) Brush (Chavár) .- Made of the husk of the nut for cleaning sieves, washing baskets and rice-drainers (Shibum). (61) Sugar, molasses (Gul) .- Made of the juice (toddy) in Goa. (62) (Band).—Peeled from the outer part of the stem of the leaf. Is used the higher classes of (63)

· day. At weddings

. . . . . . .

CODONOPSIS

ovata.

(64) Husk (Stl, Chardd, Sodan).—Used as fuel. Especially for backing purposes also affords coir fibre.  (65) Scoops.—Made of the shell. The round and deep ones are used as drinking cups.  (66) Neck betts (Italia).—Used for yoking bullocks and buffaloes to carts,  (67)  (63)  (63)  (63)  (65)  Brushes (Kunchd, Kuchrd).—The peduncles of the blossom are used for whites ashing houses, &c.  (70) Billid (Dol-Dhdfan).—Used for blinding bullocks and buffaloes while  (71)  (72)  than any other soap.  (73) Pazzles and toys.—Rings, whips, neckties, ruttles, crosses, &c.  (74) Bats for cricket.—Made of the wood (cocca-nut).	
(65) Scoops.—Made of the shell. The round and deep ones are used as drinking cups.  (66) Neck belts (**Patta**).—Used for yoking bullocks and buffaloes to carts,  (67) '  (63) tooth-brushes.  (65) Brushes (**Kunhra**).—The peduncles of the blossom are used for white asthing houses, &c.  (70) Billiod (**Dol-Dhdyna**).—Used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)  **The peduncles of the blossom are used for blinding bullocks and buffaloes while (**pt.**)	STIC
(66) Neck belts (**Intal.)—Used for yoking bullocks and buffaloes to carts,  (67) '  (63) tooth-brushes. (65) Brushes (**Kuchra*).—The peduncles of the blossom are used for white asthing houses, &c.  (70) Billod (**Didfon**).—Used for blinding bullocks and buffaloes while (**71) '  (72) '  (73) Pazzles and tors.—Rings, whips, peckties, rattles, crosses, &c.	
(67)  (68)  tooth-brushes. (69) Brushes (Kunches).—The peduncles of the blossom are used for white aching bouses, &c. (70) Blind (Dol-Dhdysn).—Used for blinding bullocks and buffsloes while (71)  than any other scap. (73) Pazzles and toys.—Rings, whips, peckties, rattles, crosses, &c.	
tooth-brushes.  (59) Brushes (Kunché, Kuchré).—The peduncles of the blossom are used for whites ashing houses, &c.  (70) Blind (Dol-Dhápan).—Used for blinding bullocks and buffiloes while (71)  (72) than any other soap.  (73) Pazzles and tors.—Rings, whips, neckties, rattles, crosses, &c.	
(50) Brushet (Kunchd, Kuchra).—The peduncles of the blossom are used for white ashing houses, &c.  (70) Blind (Dol-Dhdyan).—Used for blinding bullocks and buffuloes while (71) (72) than any other scap.  (73) Pazzles and toys.—Rings, whips, peckties, rattles, crosses, &c.	
(70) Blind (Dol-Dhdyan).—Used for blinding bullocks and buffuloes while (71) (72) than any other scap. (73) Pazzles and toys.—Rings, whips, neckties, rattles, crosses. Ac.	
(72) than any other soap. (73) Puzzles and tors.—Rings, whips, neckties, ruttles, crosses, &c.	
than any other scap.  (73) Puzzles and tors.—Rings, whips, neckties, ruttles, crosses, &c.	
(73) Puzzles and toys Rings, whips, neckties, rutiles, crosses, Ac.	
(73) Puzzles and toys.—Rings, whips, neckties, Fillies, crosses, &c.	
(75) Oil-cakes (Pend).—Oil-cake from the native mill.	
(76) Patimar (ship) (Futemars) Toy made by the boys of the fishermen	
class.	
(77) Boat, fishing (Holke).—Toy made by the boys of the fishermen class.	
(78) Kernel (Khobre) -Dry kernel.	
(73) Stem (Thintdr) —Used as broom.	
(80) Charpal, Cot (Khát, Báj) — Used by the natives (model). (81) Potash (crude) (Khár) — The ash of the stem of the leaves; they pro-	
duce 20 per cent, of ash,	
(82) Cocca-met, abortive (Vánsá Nárel, Váhil),—Used as floats for begin-	
ners in swimming.	
(83) 5-1,	
mouth of the pot to keep out flies.	
S- 419-	
Codilla.—A commercial term for the refuse separated on cleaning hemp or flax fibres.	
CODOMORA IN III O III II	
CODONOPSIS, Wall.; Gen Pl., II., 557.	
[1. 60, fig. 3; CAMPANULACER.] Codonopsis ovata, Benth.; Fl. Br. Ind., III., 433; Royle, Ill., 253, 1638	
Vern.—Lédét.	
Habitat.—A herbaceous plant common in the N. W. Himálaya from Kashnir to Gurhwál at altitudes from 8,000 to 12,000 feet, distributed	
into Afghánistán Medicine.—Aitchison (Kuram Valley Flora, in Linn Soc. Your, XIX., 14) sajs:—"The roots and leaves of Codonopsis are made into poultices  1630	E.
and employed in the treatment of bruses, ulcers, and wounds "	
Food.—"The large tap root is ground into flour and eaten in FOOD.	
Lahoul" (Stewart: Aitchison). In Kuram it is said to be eaten raw or cooked,	

C. 1640

COFFEA arabica	Coffee
1641	COFFEA, Linn, Gen Pl, II, 114 [Rublacezz] Coffea arabica, Linn, Fl Br Ind, III, 153, Wight, Ic, 1. 53.
	Coffee, Eng, Caré Fr, Kaffee, Germ  Vern —Bun (the berry), Kaham isha and bun, ban, coffee coff, Kasa, bun, kaham, in the care and core, Mala, kaphi Anan, kaphi s, k
	References Roxb Fi Ind , Ed CBC 181 Brandis, For Fl , 176;

#### Coffee Cultivation.

COFFEA arabica CULTIVA-TION.

Habitat -Most authors seem to agree that the coffee plant is indigenous to Abyssinia, the Soudan, and the coasts of Guinea and Mozam-"Perhaps in these latter localities, so far removed from the centre, it may be naturalised from cultivation. No one has yet found it in Arabia, but this may be explained by the difficulty of penetrating into the interior of the country If it is discovered there it will be hard to prove it wild, for the seeds, which soon lose their faculty of germinating, often spring up round the plantations and naturalise the species has occurred in Brazil and the West India Islands, where it is certain the coffee plant was never indigenous" (De Candolle)

It is a small, much branched tree or bush 15 to 20 feet in height, with whitish bark and white orange-like flowers The fruit, which is red on ripening, is about the size of a small cherry, and contains two seeds, closely united These, on being separated constitute the coffee berries

of commerce, and on being roasted and ground, the coffee of the shops In India Coffea arabica—the coffee plant—is largely cultivated, but

other species are also met with

2 C bengalensis, Roxb, occurs from Kumáon to Mishmi, also in Benga (Hirn

3 (

like the two last

4 C Jenkinsu, Hook f , Khási Mountains Fruit and seeds d fferent from the last, being ellipsoid

5 C khassana, Hook f , Khass and Jaintia hills Fruit 1 inch in diameter, smooth, seeds ventrally concave

6 C travancorensis, IV & A . occurs in Tranvancore Fruit broader

than long
7 C Wightiana, W & A, the Western Peninsula, in and places

from Coorg to Travancore Fruit much broader than long, with a deep furrow

With the exception of the first these species are not of any special economic importance, and very little coffee is grown in the tracts in which they are reported to be found The coffee cultivating region in this country is Southern India, and the enterprise has there gained much importance It at present not only supplies most of the coffee consumed in India, but exports large quantities to other countries

(For Liberian Coffee see the concluding paragraph of this article )

#### HISTORY OF COFFEE CULTIVATION AND OF THE HABIT OF COFFEE DRINKING

The regions best suited for coffee cultivation lie between 150 N and 15° S latitudes, but it is grown as far as the 36° N to the 30° S in regions where the temperature does not fall beneath 55° F (13° C). The area of its cultivation is in fact very nearly the same as that of cotton. Within the tropical region it may be cultivated at the level of the sea or even much further to the north and south of the equator than has been indicated The plant manifests, in other words, a remarkable power of endurance, but it does not follow that where it may be grown as an ornamental garden bush it may there afford the com mercial product Within the tropics it will yield profitable returns only

1642

COFFEA arabica. HISTORY.

# Habit of Coffee-drinking.

churate within the tropics is that required. An atmosphere resembling that of an English hot-house produces the finest crops, but it is immical to the planter and favourable to weeds that which Europeans prefer to sential for tea culturation. Heavy clouds a way the flowers and gales concerning.

winds blow away the flowers and make 50 per cent. uinc. rop. If too hot and dry, the plants require shade, and il strong winds prevail during the flowering season, belts of forest have to be left to protect the plantation. This is regarded an important consideration in clearing land for a collee plantation. Dr. Shortt says: "In low countries there is not sufficient moisture in the soil, and when shaded and irrigated, it produces a coarse and uneven bean devoid of the peculiar aroma essential to good coffee." While the coffee plant does not seem to luxuriate on the immediate coast and under the direct influence of the sea breezes, still it is a noteworthy fact that in India the best gardens (such as those of the Nilghiris, the Wynaad, Mysore, Coorg, Mungerabad, and Shevaroys) bear a certain relation to the coast, indeed few good plantations occur beyond the limits of marine influence. On this account the recommendations of the early advisers of the Government of India to prosecute experimen-tal collee cultivation on the lower Himálaya from Darifling to Kumáon have been abandoned. The occurrence of certain wild species on the mountains of Northern and Eastern India has been shown to afford no criterion of the possible regions where the African plant might be successfully grown Coffee-planting has in fact been practically concentrated on the lower mountain slopes of South India, a region which like Ceylon has many features in common with the Abyssinian and other African regions where the wild coffee abounds Some parts of the Nilghiri hills are, however, found to be too high, the plants growing well, but not maturing their seeds.

It has been stated that the coffee plant of commerce is truly wild an Abyssina, and that it is there called dun or boun This same appears to have followed it into Egypt and Syna Bellus and Alpin both write of it under that name, and state that the Egyptians extract the drink called early from the seeds A reference to the vernacular names in a preceding paragraph will show that both these names are used in India and occar also in the Arabic and Persuan languages. Yule and Burnell remarks: "There is very fair evidence in Arabic literature that the use of coffee was mitroduced into Aden by a certain Sheikh Shihabuddin Dhabhani, who had made acquaintance with it on the African coast, and who died in the year H \$75, i.e. AD 1470, 50 that the introduction may be put about the middle of the fiteenth century—a time consistent with the other negative and positive data From Vemen it spread to Mecca (where there arose siter some few years, in 1511, a crusade against its use as unlawfull, to Cairo, to Damascus and Aleppo, and to Constantinople, where the first coffee-house was established in 1554. The first European mention of coffee seems to be by Raqwolff, who knew it at Aleppo in 1573," (Conf. with remarks in a Iurther page regarding introduction into India)

The habit of coffee-drinking spread but slowly from Arabia Felix, but in Mahomedan countries through which it became gradually diffused, it soon met with the opposition of the priests, owing to the coffee-houses having become more popular than the mosques. To check this, the article was heavily taxed. The first mention of a coffee-shop in Great Driban, occurs in 1652. [Tea was publicly sold in Landon in 1657] Mr. D. Edwards, a Turkey merchant, acquired the habit of drinking coffee and imported a Greek servant, Pasqua Rossie, for the purpose of preparing his favoured beverage. His fixends grew so fond of it that to prevent their

## Consumption of Coffee.

COFFEA arabica.

HISTORY.

sustained in Constantinople, Charles II, (in 1675) viewed these shops as the meeting-places for disaffected persons, and a royal proclama-tion was issued for their suppression. Coffee is spoken of as being in tion was three for their supplies and the same as opened in Pairs in 1600. Shorth after, it became general throughout Europe. It may be here added that of the three great dietary becames as the first to make its appearance in Europe, coming from South America

lative measures appear to have had much to say to the growth of a greater coffee consumption in continental countries than in England, or rather to the decline of coffee consumption manifested in Great Britain with the growth of the tea demand.

DECLINE OF CONSUMPTION IN BRITAIN .- The consumption of coffee in Great Britain was, in 1847, 37,411,370; in 1857, 34,1518,551b in 1867, 31,567,760h; but in 1874 it had declined to 31,859,405lb, and slightly improved in 1889, being in that year 3,480,000h. These figures must not be confused with the imports of coffee. Great Britain does an immense trade in importing and re-exporting the beans or in exporting special preparations of coffee. The imports into Great Britain average from 130 to

BRITAIN. Decline in

example, from 1857 to 1859, it was 11th, from 1865 to 1867 it was 1th, and

Empire consumes the greatest amount. Holland takes 21h per head,

Denmark 14th, Belgum 13fth, Norway 9fth, Switzerland 7th, Sweden 6th, France 2fth, Austro-Hungary 2th, Greece 14th, Italy 1th, the United Kingdom 4th, and European Russia 4th. The United States of American ica are supposed to use on an average 8th per head of population per annum. Mr. H. Pasteur, in his report on the coffee shown at the COFFEA Habit of Coffee-drinking. arabica. HISTORY. climate within the tropics is that required. An atmosphere resembling that of an Final ch Las to the my and movernity station, belts of forest have to be left to protect the "aring land iere is not produces sential to While the collee plant does not seem to luxuriate on the immediate coast and under the direct influence of the sea breezes, still it is a noteworthy fact that in India the best gardens (such as those of the Nilghiris, the Wynaad, Mysore, Coorg, Mungerabad, and Shevarous) bear a certain relation to the coast; indeed few good plantations occur beyond the limits of marine influence. On this account the recommendations of the early advisers of the Government of India to prosecute experimen-tal coffee cultivation on the lower Himálaya from Darilling to Kumáon have hear shouland It has been stated that the coffee plant of commerce is truly wild in Abyssinia, and that it is there called bun or boun This name appears to have followed it into Egypt and Syna. Bellus and Alpin both write of it under that name, and state that the Egyptians extract the drink A relament on La . a willed one & from the tends India and Burnell re-

coffee was introduced into Aden by a certain Sheikh Shihabuddin

other negative and positive data. From veinen it spicau to affice a tree

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enth it on the African coast and

# COFFE Consumption of Coffee. arabica. HISTORY. tion was issued for their suppression. Coffee is spoken of as being in use in France in 1640, and the first public case was opened in Paris in 1660. Shortly after, it became general throughout Europe. It may tea, the price of that article teil considerably, and --- 14 % been legalised, chicory, the most important of these, being made to bear a

growth of the tea demand. n Great Britain was, in 1847, 37,441,373b; in 1857, 34,518,555b; in 1867, 31,567,760b; but in 1874, 31,441,373b; in 1857, 34,518,555b; in 1867, 31,518,554,55b; but in 1874, 31,41,373b; in 1857, 34,518,540b; and slightly improved in 1880, being in that year 32,480,000b. These figures must not be confused with the imports of coffee. Great Reliance and the state of the confused with the imports of coffee. trade in importing and re-exporting the beans or in exporting special preparations of coffee. The imports into Great Britain average from 130 to

from 1875 to 1877 it had tallen to 1th. Even where the consumption is in the ascendant (in non-coffee-producing countries) the increased consumption is not proportioned to the increase of population, so that in Europe at least the demand for coffee is not materially progressing. The German Empire consumes the greatest amount. Holland takes 21th per head, Empire consumes the greatest another properties of the properties of the Denmark 13th, Belgium 13th, Norway 9lb, Saitzerland 7b, Sawden 6lb, France 2lb, Austro-Hungary 2b, Greece 1sh, Italy 1sh, the United Kingdom Hb, and European Russa' Hb. The United States of America are supposed to use on an average 8th per head of population per annum. Mr. H. Pasteur, in his report on the coffee shown at the

COLLEV Coffee Cultivation Extended. arabica. HISTORY. Cotonial and Indian I'abib tion in Lordon, 1836, wrote : "The Ktal production of coffee in the world is roughly estimated at about 600,000 to 650,000 tons, of which Brazil alone produces between 310,000 and 381,000 tons, and Java Co, root to graphs time; the preportion of British-grown coffee es 4,000 to 5,000 ters nce. Nowhere is finer tiue, as well as that of kinds, even of Mocha. which at one time stood above all others." EXTENDED Extranen Cultivation .- The cultivation of the coffee plant began CULTIVA-TIDN. to extend towards the end of the seventeenth century, being carried on in various countries possessing a sub-tropical climate, such as India, Java, 1614 Ceylon, Jamaica, and Brazil. Down to 1600, the only source of coffeesubly the fair a fair referrate Culerous Co see (Ann Houses) of the plant of the first The same on Heddand as a present to the Govplants gre sted in the Bothnic ernor of t · plant were sent to Gardens east east however. coffee Louis. oughlava Brazil ullion plants under careful cultivation. Coffee is also extensively grown in Costa Rica, Guttemala, Venezuela, Guiana, Peru, and Bolivia with Jamuica, Cuba, Porto Rico, and the West Indian Islands generally. Its cultivation has long been pursued in Queensland, and in various other lands of the control of th o been Cevion and India are the countries where its introduction has assumed an important commercial character.

CEYLON Introduction. 1645

> Indian Exhibition "represent only the fast vanishing remains of what was but nine years ago the most extensive and flourishing of the coffee crops raised on British soil by British enterprise and capital. The production, which in 1873 amounted to nearly 1,000,000 cut, declined to 665,000

ropean Ceylon fungus

#### Introduction of Coffee Cultivation into India.

COFFEA arabica. HISTORY. INDIAN.

cut in 1876, to 312,000 cut. in 1884, and to 230,000 cut in 1885." (Pasteur)

INTRODUCTION INTO INDIA.
Into India is very obscure. N

Mysore some two centuries ago Budan, who, on his return from This tradition is so universall

rans indicated by a Universal present part of South India, that there seems every chance that there may be come foundation for it. Jan Huygen van Linschoten, a native of Holand, who, under the protection and in the service of the Portuguese, visited India in 1376 to 1500 (and wrote a most instructive account of his travels), while describing all the important products of the Malabar Coast from

the Total and a second the Total and the second the fruit,

yppians t hear of ee plant the pil-

plant has long been introduced into India, and coffee of a fine quality is cultivated on the coast of Malabar, also to a considerable extent in

Combatore, and the cultivation might, no doubt, be easily extended elsewhere. It was tried in the Calcutta Botanic Gardens, where it succeeded remarkably well under the shade of the teak plantations, and nothing could be more healthy looking or in better bearing than these coffee plants when seen by the author in 1823 Dr. Roxburgh had long previous to

r seven years,

b of the dry

Jamaica promittee of the
House of Commons, stated "I will say for myself I never used to drak
good coffee except that produced in the Company's garden at Calcutta."
Subsequent writers have, however, shown that while the plant can be

doned. There are at present some to acres under coffee in Lohardugga

1830, but as a curiosity Major Bevan grew coffee in the Wynaad in 1822. It was cultivated by Mr. Ockburn on the Shevaroys in 1830, in 1840, the plant was earlier, to Darjuling,

subsequently It has

COFFEA
arabica.
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# Coffee Cultivation-Locality

## HISTORY.

thousands of acres of good suitable land for coffee near nasigable rivers where manure and labour are chean.

Coffee has also been introduced into Burma. For some time the effort to open out plantations seemed to be doubtful; and Mr. Petley, speaking of the garden on the Karen Hills, rotthers it of lounger, repried recently that much damage had been done by a mole cracket. Since then, lowestry, the construction of a railway from Rangoon through a hopeful coffee region has given birth to new expectation. The Arri-Hornicultural Socrety of the demand was great for seed.

Large numbers are reported is added that "it is noteworthy

that the Arabian variety does best on the Loungoo Hills, while at Tavoy the Laberlan variety is alone thought worthy of cultivation." "Local being taken up along the lines of Toungoo, and gardens have been we cultivating from and other useful.

trees as well as coffee."

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## METHODS OF CULTIVATION.

Space cannot be afforded to deal with every feature of this subject; the reader is referred to the numerous special publications quoted under the paragraph of reference; only the more salient features will be touched upon, and especially those which have a bearing on the future expansion of the industry.

The state County of the state of County of the state of County of the state of the

uense iotests in the rising west lind, has

inken up a poor grassy or stony situation, and however much water he may have access to, his plants are stunted and soon become sellow, unless the resorts to heavy manuring at a very early stage, which materially in-

those on forest land, and are not so Instang. The berry produced on rich ferruginous clay is found to contain more aroma and the bean is heavier when compared with those of other localities. This fact is so well known

subject to us of para

mount importance and should not be sacrificed for vicies son, as the latter can be artificially obtained much quicker than the former. In wooded country the estate may be luid out in blocks of 50, acres, encircled by

#### Coffee Cultivation-Seed.

COFFEA arabica.

METHODS.

natural belts of forest. Flat land must be avoided, and wet soil is fatal to coffee, and flat lands would entail great expenditure for drainage slopes, on the other hand, are objectionable, on account of the wash occasioned by rains carrying away soil and manure and exposing the roots of the shrubs. The surface soil must be fairly good, the subsoil may be poor but must never be stiff clay, the shrub is essentially a lateral feeder a general rule virgin forest land has been found most suitable to break up for coffee estates, it has become naturally enriched by decayed vegetable matters, and the burning to which it is subjected frees it from insects and from weeds" Not only therefore do the opinions expressed in these two passages differ as to the degree of moisture which the soil should con-tain,—Dr Shortt saying it should "abound" and the writer in Spons' holding that moisture is "fatal"-but Dr Shortt remarks, the planter "must be in the enjoyment of robust health, to be able to withstand the deadly effects of a damp atmosphere, for, in all probability, he will have to spend his time surrounded by the direct malaria, &c." Spons', on the other hand, says "-" The most suitable climate is precisely that which Luropeans prefer Fost, even though it be only at night and for a short period, is fatal " It seems probable that opinions have greatly changed

( ) just quoted from Dr. Shortt's work are much more applicable to Tea than to Coffee

Nursery and Seed.—Having selected the site for a plantation, clerred and burned the trees (taking care, where necessary, to have protecting belts against prevalent winds), laid out the roads and carried the water-supply to the coffee-house, it next becomes necessary to select and prepare the spot for a nursery. The soil should have a genite slope, be well drained but retentive of moisture, rich and within access of artificial or natural irrigation. The land should be thoroughly ploughed up or trenched to a depth of 18 to 24 inches and the weeds entirely externinated. Manure at the rate of from 3 to 5 tons an acre should be worked into the surface soil. The seed-beds may be shaded, but not to the exclusion of the sun, nor to such an extent as to allow draping from the protecting trees,. Each bed should be raised to allow draping, and separated from the others by narrow paths. If on sloping ground, a deep trent, should

be run round the top portion of the nursery so as to divert the surface water

The seeds should be sown in rows 6—9 inches apart and about 2 inches

the morning or alter sunset.

The selection of seed is of great importance. The stock should be taken from carefully cultivated, healthy, and sigorous plants from 7 to 10 years old and the seed should not be gathered until fully appearance of the stock should give 20,000 to 30 000 plants, the best is farchineral managed of the stock should give 20,000 to 30 000 plants, the best is farchineral managed.

and sown

when fresh, at a depth of 1 inch, and a blied in the sol in dell's to to 12 inches apart from each offer, so as to give the plantings plenty of room to grow, and sub equently enable the planters from the multipacting from the numery to the plantation, or the seeds may be soon in disk,

Nursery.

Seeds

COFFEA arabica.

Coffee Cultivation-Locality.

HISTORY.

thousands of acres of good suitable land for coffee near navigable rivers where manure and labour are cheap.

Coffee has also been introduced into Burna. For some time the effort to open out plantations seed to be doubtful; and Mn. Pethey, speaking of the garden on the Karen Hills, north-east of Foungoo, reported recently that much damage had been done by a mole crocket. Since then, however, the construction of a railway from Rangson through a hopeful coffee region has given birth to new expectations. The Agri-Horizcultural Society of Burma, in their annual report for 1887, say, the demand was great for seed-lings, both of Arabian and Liberian coffee. Large numbers are reported to have been sent to Upper Burna. It is added that "it is noteworthy that the Arabian variety does best on the Toungoo Hills, while at Tavoy the Liberian variety is alone thought worthy of cultivation." "Local demands, too, are increasing, as land is being taken up along the lines of railway between Rangoon, Prome, and Toungoo, and gardens have been formed whereon small grantees are now cultivating fruit and other useful trees as well as coffee."

METHODS.

#### METHODS OF CULTIVATION.

Space cannot be afforded to deal with every feature of this subject: the reader is referred to the numerous special publications quoted under the paragraph of references, only the more salient features will be touched upon, and especially those which have a bearing on the future expansion of the industry.

LOCALITIES, CLIMATES, AND SOILS SUITABLE FOR COFFEE CULTIVA-TION AS AV AGRICULTURAL PRODUCT -Under the heading "History of Coffee," the subject of the region of coffee cultivation and the climate necessary have been discussed Dr. Shortt says of soil; "This should be rich, abounding in moisture, and containing much humus or vegetable mould, consequently we find that the plant thrives best on either red or black clay, containing combinations or preparations of iron, and covered over with humus formed by the decay of vegetable matter produced by dense forests When these points are overlooked, the results are soon seen in the rising plantation. The planter, perhaps, instead of choosing forest land, has taken up a poor grassy or stony situation, and however much water he may have access to, his plants are stunted and soon become yellow, unless he resorts to heavy manuring at a very early stage, which materially increases the expense of the concern. In hard rocky soils the pits require to be deeply excavated to permit of the tap roots of the plant striking perpendicularly down, and even when every precaution is taken, it will be found that estates opened out on poor soils will alway prove more expensive than those on forest land, and are not so lasting The berry produced on nich ferruginous clay is found to contain more aroma and the bean is heavier when compared with those of other localities This fact is so well known to collectivokers generally that, in London a new importation is frequently weighted after being roasted. Some difference of opinion prevails as to the degree of moisture the soil should contain. In Spons' Encyclopadia the degree of moisture the soil should contain there occurs the following "The points which determine the value of a plot for coffee culture are-1, elevation, 2, aspect, 3, shelter from winds; 4, shelter from wash, 5, temperature, 6, rainfall, 7, proximity to a river, 8, character and richness of soil. Most of these are necessarily subject to variation according to localin. Shelter from wind is perhaps of paramount importance and should not be sacrificed for richer soil, as the latter can be artificially obtained much quicker than the former. In wooded country the estate may be laid out in blocks of 50, acres, encircled by

Coffee Cultivation-Sée

COFFEA arabica.

METHODS.

nd is fatal to age. Steep wash occaroots of

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tiust quoted from Dr. Shortt's work are much more applicable to Tea than to Coffee.

Narsery and Seed.—Having selected the site for a plantation, cleared and burned the trees (taking care, where necessary, to have protecting belts against prevalent winds), laid out the roads and carried the water-supply to the colflechouse, it next becomes necessary to select and prapare the spot for a nursery. The soil should have a genite slope, be well drained but retentive of moisture, rich and within access of artificial or natural ririgation. The land should be thoroughly ploughed up or trenched to a depth of 18 to 24 inches and the weeds entirely exterminated, Manure at the rate of from 3 to 5 tons an arcs should be worked into the surface soil. The seed-beds may be shaded, but not to the exclusion of the sum, nor to such an extent as to allow drainage, and separated from the others by narrow paths. If on sloping ground, a deep trench should be runsed to allow drainage, and separated from the others by narrow paths. If on sloping ground, a deep trench should be runsed to such an extensive such described to such as to diver the surface

The seeds should be sown in rows 6-9 inches apart and about 2 inches in depth, the seeds being circluly deposited along these lines about 1 inch apart from each other. They should then be lightly covered with mould and mats or by branches thrown over the beds. Watering should be done in the morning or after sunsets.

The selection of seed is of great importance. The stock should be taken from carefully cultivated, healthy, and vigorous plants from 7 to 10 years old and the seed should not be gathered until fully npe. "A bushel of seed should give 20,000 to 30,000 plants, the best is parchiment coffee, picked when fully ripe, pulped by hand, unfermented, unwashed, and dried in the shade" (Spons).

"A bushel will rear 10,000 plants covering 10 acres." (Balfour, Cyclop Ind.) "They should be fully ripe when plucked off the branches, and some when Iresh, at a depth of 1 inch, and dibbled in the soil in drills 10 to 12 inches apart from each other, so as to give the plantings plenty of room to grow, and subsequently enable the planter to remove them with facility from the nursery to the plantation; or the seeds may be sown in drills,

Nursery.

Seeds 1610

COFFEA Coffee Cultivation-Planting. arabica. METRODS. and as the seedlings begin to grow the drills should be thinned out to the same distance. The seeds may be even scattered broadcast in the beds, and as they sprout should be thinned out to the regulated distance; care should be taken to let the plantings grow free of each other, which will make them vigorous." (Shortt) " When the plants have two to four leaves they should be carefully transplanted, in damp, cloudy weather, from the seed-beds to the nurseries, and placed 9 to 12 inches apart. Care must be taken not to double up the tap-root, and not to leave a space for water to accumulate and rot the roots. If the tap-root is very long, it is best shortened by an oblique cut, when it soon shoots again. When transplanting from the seed-beds to nurseries is not practised, the plants are left in the seed-bed until they have grown larger; but Stainbank and others strongly recommend the former plan, as, by checking the growth, the young wood becomes hardened, and better able, when finally planted out, to resist insects and un-favourable weather. A practical suggestion for preventing young seedlings being eaten off at the surface of the ground by grubs, is to lightly wrap round a piece of paper about 3 inches broad, where the stem joins the root, on planting." (Spons.) Planting out. LINING AN "lined out" fo 1650 are in vocue : ( up and down this line, stake upon for the pc. . stretched parallel with the base line and as straight as possible; small . Jad at an thora times a rome is finally held across them iring poles, and the fixed ones, s furnished with bus of scarlet rag at the distance fixed upon petween the plants; it is stretched across the plot and stakes are inserted at each rag; the rope is --- -- -- we want by mencuring-rods. ut is more laboriretch of the rope in their permaelected for transplantation, many coffee planters prefer to have two year old seedlings. Much difference of o tion hinges mainly o nature of the climate attain any great siz'. case under influence distance adopted varies between 4 and 8 feet each way-7 feet being very common, or 6 feet between the plants and 7 feet between the rows. a . and alants in the acre. Before the plants are removed · nnts each If be firmly packed around the seedings so as to prevent water symp and soaking into the roots. CULTURAL OPPRATIONS -The further treatment may be briefly re-Cultural operations. viewed. Weeding, or the removal of all wild plants from the plantation so

1651 View

# COFFEA Coffee Cultivation-Shade. arabica. METHODS. aking, or supe engueh, and degree to which nature of the s deprived the plantation of the natural protection which belts of trees would have According to many planters, however, all trees should be removed and shade procured through the cultivation of the charcoal tree (Sponia Wightii). In two years this forms an ample shade, but as it grows older the leaves are shed, so that it requires to be renewed. This is easily done, the timber coming in useful. Marshall Ward, in his report on the coffee-leaf disease, urges the advantage of belts of trees in helping to check the diffusion of the source of the fungus. "It is a matter for regret," he adds, "that such immense unbroken areas of coffee exist without break of any kind, and one can trace the swaying backwards and forwards of the spore-laden winds in consequence." Draining .- Nothing is more important than a complete system of drains and roads. If the operations in this direction have not been completed up to date, the enerof the element of somethe fort to a serve answer the purpose of refuse pits for the accumulation of manure, cultivation than due ! surface soil, if fully

plantation are not aiways applicable to another, so that no general rule can be laid down, and the indications afforded by the soil itself must be followed. Most planters urge the necessity of forking the soil at least once a year. This consists in softening the hard-trodden soil by digging it up by means of an iron fork to a depth of 12 to 18 junches.

Sabonadiere

presers to C. 1652

the most expensive contain lime it becc is well-rotted dung, be resorted to. Th

> Pruning. 1652

COFFEA arabica.

# Coffee Cultivation-Pruning.

METHODS.

postpone the operation till the shrubs have borne their maiden crop, even though extra strking be required to withstand the wind. His plan is to remove the two primaries at the required height, by a sloping outward cut close to the stem, and then to remove the top by an oblique cut, so that the stumps resemble a cross, and a firm natural knot remains to guard against the stem splitting down. Hall (Ceston) contends that the plants should be topped as soon as they have reached the required height, when the soft wood is easily severed by a pinch between the finger and the thumb. In Natal the shrubs are topped either at their full height-41 to 5 feet-or at 3 feet, allowing a sucker to grow up on the weather side to complete the height. The latter plan is preferred. There is much advantage gained in limiting the height to 5 feet; not only is the crop gathered more easily and without damage to the tree, but it is actually heavier, and the shrubs are more readily made to cover the ground." (Spons' Encyclop, 696.) Dr. Shortt says: "Pruning consists of various operations connected with either arresting the height of the plants to cause them to spread out laterally, or in removing the additional growth of wood, to encourage the plants to push out new fruit-bearing shoots. These various operations come under the different heads of topping, pruning, and handling," With regard to topping he adds: "It is undoubtedly called for on all plantations that he exposed and are likely to suffer from gales, &c., but in sheltered localities it does f .- Lin for ladders

he question turns." The masses of shoots; these me "The first to appear

der the primary boughs:

primaries spring secondary branches, in pairs, aindat very short intervals. All such appearing within ask inches of the main stem are removed at once, so that a passage of at least a foot is left in the centre of the tree for the admission of air and sun. The object of pruning is to divert the energies of the plant from forming wood and to concentrate them upon forming fruit. The fruit of the coffee tree is borne by young wood, and as the secondaries are reproduced when removed, they are cut off as soon as they have borne, and a constant succession of young wood is thus the primary the primary to constant the primary that the primary that the primary the primary the primary that the primary the primary the primary that the primary tha

effect of the feet in height rvals of about along these

boughs a constant supply of secondary frut-bearing we ge. All ascending or cross-wise branches or turgs are at once removed, so as to force the plant into the arbitrary and unnatural type of horizontal spreading branches which have the advantage of exposing to the sun and hight a large surface from which the crop can with ease be removed. When practicable, the bushes should be handled twice before the crop, and secondary fruiting turgs pruned off after removal of the crop. The pruning should be finished before the ensuing flowers begin to form, but where this has been neglected, and it is apparent that a flush of so heavy a character as to weaken the plant has set in, it will be necessary to sacrifice

#### Coffee Cultivation-Season.

COFFEA arabica. METHODS.

Catch-crops.

1653

Seasons.

1654

this by pruning the plant down to the extent it may be expected to fruit without injury. The lateral or primary boughs should not be allowed to grow more than 21 feet, otherwise they will droop and exclude the light from those below. In pruning, it is often recommended to leave the opposite lateral to that removed, so as to allow of its fruiting next year By thus cutting the secondaries every other year a continuous crop is secured All tertiaries should be systematically nipped off, broken, dis-

eased, or dead branches should be cut off CATCH-CROPS -Much has been written for and against the growing of other crops along with coffee In Durjeeling it was tried to grow tea and coffee together, but with little or no success, in spite of the fact that the out door labour and manufacture of these crops so fit into each other that economy might be effected. In Natal and other countries, plantains, The second power and section

and

SPASONS FOR COFFEE-PLANTING AND MANUFACTURING OPERATIONS -The industry being chiefly in South India, the seasons for opera-tions very closely correspond with those of Ceylon. The season for commencing agricultural operations is about October, and the buildings require to be finished by January The best time for firing the telled trees is the beginning of February, the trees having been allowed to dry for about two months About the same time the land should be lined and

> tsually rains The

op of

ntinue every year after. About October every preparation should be complete for the collection of the crop and the manufacture of the berries. fruits commence to ripen in October or early in November and continue till January Thus from flowering to harvest occupies about eight months None but fully tipe berries (technically known as "cherries") should, ac. cording to Dr. Shortt, be collected, the women and children going over the plantation periodically to remove all the bright or blood red ones, while carefully leaving the others to mature, once ripe, the sooner collected the Mr Pasteur says "The usual course, however, is to pick the Charry before complete mot - 1

The preparing or manufacturing of the "cherry" into the "berry" will be found dealt with in a further page

INDIAN ARPA UNDER, AND OUTTURN OF, COPFFE.

The cultivation of coffee is practically confined to Southern India, Area and out-During the three years 1883, 1884, and 1885 the average area under mature

INDIAN.

turn 1555

C. 1655

## COTFEA # * 2 4. CA.

## Arra of Coffee Caltiration in India.

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#### COFFEA Area of Coffee Cultivation in India, arabica. AREA AND planters diately t plants ar ıÌ forest "The success of Mr. Cannon's experiment led to the occupation of , ,, , ... Cof estates from the northern slopes of the Baba Budans to the southern limits of Manjarabad, not to mention Coorg and Wynaad beyond" The above account of the introduction of coffee into Mysore was first published by Colonel Onslow, from whom all subsequent writers have borrowed their information without materially adding to or correcting any one feature of the original statement Madras Presidency -The following extract taken from pages 290 and MADRAS. 201. Vol I of the Madras Manual published in 1885, gives interesting 1657 particulars regarding the cultivation of coffee in the Madras Presidency: The principal coffee tract of Southern India is along the western coast, and coffee estates extend in nearly an unbroken line along the summits and slopes of the Western Ghauts, from the northern limits of Mysore down to Cape Comorin. The only portions of the area within the limits of the Madras Government are the Wynaad tract and the Nilgin Hills, the rest being in Mysore, Coorg, and Travancore." Of the early plantations the Madras Manual adds; "Nearly all the land taken up at this period was what is known as grass or bamboo land, and in consequence most of the estates proved unprofitable Of many of them not a trace, except the ruins of bungalows, remains at the present day. After the first attempts, coffee cultivation was transferred to South South For ten or fifteen years it made little progress In 1855 and 1856 a number of new estates were opened out, some too hastily, and con-1658 sequently with little success In 1862 the return showed 9,932 acres under In 1865 there were 200 estates covering 14,613 acres cultivation official enquiry was made on the subject of Wynaad coffee in the year 1868, and, according to the returns then made, the acreage was 20,000 08. of which 21,479 54 acres were held by Europeans and 8,429 54 acres were held by r . 41 acres of of land . per acre tion ibo return On the M the crops, as very little passes out by Mysore or Combatore .. Cwt. 1856-57 32,658 1857-58 16,204 36,034 1858-50 1850-60 49,080

1861 62

1862-63

1863-64

1864-65 1865-66 1866-67

1867-68

C. 1658

91,080

43,007

91,947 110,548

125,891

128,011

COFFEA arabica, AREA AND

## Area of Coffee Cultivation in India.

plants was returned at 186,500 acres, and the average yield at 31} million pounds, which were thus distributed -

			Tor	AL		186,500	31,250,000
Cochin	•	•	•	٠	•	2,200	830,000
Travancore	•	•	•	•		4 800	820,000
Coorg .	•	•				42,300	9 330,000
Madras		•				55,100	13,160,000
Mysore	•	•		٠		82,100	7,110,000
						Acres	15

These statistics, which are *aken from the Statistical Tables of at of Finance and Commerce up \ stive States of Cochin, Travancore, and Mysore, and hence the area given is greater than that returned (119,142) in the Agricultural Statistics of British India published by the Department of Revenue and Agriculture The total area taken up for coffee cultivation is 354,331 acres, of which 39,618

-enced to give a return are still available in at there exists 200,000

nent for Nilghri coffee

is Calicut, to which the crops are conveyed for a considerable distance by water. The Shevaroy Hills are more inland, and cultivation does not seem The and a m ch on these hills the distance from sea being proulls, and the

and Raipore

Ranways should ten much in their lavout. In 113000, or co-cultivation is not likely to extend very much, as all the available coffee land has been - - - Q are more nder mature nints, 81,543 Mysore

· too great · except on

the sheltered tracts

"A northern aspect is best, being moist during the dry season, and possessing the most uniform temperature, but it will be modified either eastwards or westwards according to the locality, so as to suit the prevailing winds. On the western slopes of the coast-ranges, the south-west monsoon bursts with such force that coffee cannot withstand it, in that situation, therefore, an easterly tendency of aspect is imperative inland, the drier and hotter climate will compel a westerly deviation, so as to catch as much as possible of the monsoon rains In the western or wetter districts, shade is inadmissible; in the eastern or direr districts, it becomes a necessity" (Spons' Account of the Coffee Dietrict of Mysore ) The following passages regarding the seats of Indian coffee cultivation

may be found usefui .-In Mysore the cultivation is limited almost exclusively to the Kadur In Vol. 11., page 410 of the Mysore Gazetteer published in 1876, it is stated that "the coffee cultivation of Southern India may be said to have had its origin in this district, for the plant was first introduced Lawadan a lorim named Baba Budan,

tries in his wallet, and, tak-

MYSORE. 1656

· Area of Coffee Cultivation in India,	COFFEA arabica,
The state of the s	AREA AND OUTTURN.
forest.	
"The success of Mr. Cannon's experiment led to the occupation of	
of estates from the northern slopes of the Baba Budans to the southern	}
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per acre in the W	
return. The table below, showing the quantities of Wynaad coffee shipped	
on the Malabar coast during a period of twelve years, indicates nearly all the crops, as very little passes out by Mysore or Coimbatore:-	
· · · · · · ·	
1856-57 32,658	
1857-58	
1859-60	
1851 62	
1862-63 43,997 1863-64 91,947	
1864-05	
1866-67	1
C. 1658	

COFFEA arabica.

## Area of Coffee Cultivation in India.

ARFA AND OUTTURN Bilghiris 1650

"Coffee cultivation on the Nilgh to was reported on in 1872. A large area of find on the Nilgh ris has projed to be admeaby suited for the cultivities of the color shead. Not less than 22.8 ff acres are now under coffee plantate ha besides 12 221 arres taken up for planting frienty-five years ago the area under coffee il d no much exceed 500 This great increase is entirely the result of private enterprise, and has added much to the prosperty of the helphins while at the same time benefiting the districts immediately adjoining. In the establishment of these coffee estates a property has been created worth about 5 millions of supers Of the total expend ture, that one third is for the payment of a tges to coolies, and most of this is carried into the low country, either in priment for food gruns consumed by plantation con ies, or as each carried by the coolers themselves when they return to their homes. Estimating that the sum sent into the low country in this way represents annually R6 00 000, this will support about 11 000 families of labouring people Moreover, in currying coffee to the court, and surting pucking &c, a large amount of other labour is employed. Until a len years previous to eastern slopes, but they have now been extended to the southern, northern, and north western slopes; there are also some extensive plantations in the Ouchterlony Valley and in the neighbourhood of Coonoor Coffee cultivation is also carried on on the Sheraray Hills in the Salem District, where nearly 6000 acres are under . has been taken up for planting; on the

Madura where nearly 4 400 acres have area has been taken up for planting, and in the linnevent and Lon out tore Districts in the former of which there are about 2,000 acres under coffee and in the latter about 800 acres"

In Coorg coffee is also extensively produced, for there are but few Eu eport

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_urnthere he in the provide sis to be p peans and 4,594 by natives, comprising an area of 77,474 acres or a little

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whole area 40 450 are bearing, producing 0 125 ions of coffee, or on in averag

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acre estates

cultivation at the rate per acre assumed above comes to the Of this not less than 60 per cent on an average may be estimated as having been paid to labourers in wages Calculating that 26,893 labourers, which is about the average number employed throughout the At at 19 lakhs of tupees were

the coffee produced, cwt on the spot, was

Travancore 1661

Toorg.

former State in 1885 he area under coffee y within the past few

## Coffee Manufacture

COFFEA arabica, AREA AND OUTTURN.

years, there but no

the group known as the Anamallays," "The plateaux, by reason of their good clime, rich soil, abundant timber and water-supply, are likely to become better known as the demand for coffee-land increases. On plateau alone (Eroovimullay, or Hamilton's Valley) is 6 miles long by 3 wide, and contains about 10,000 acres of excellent tea and coffee land."

In Columber were miles?

In Cochin there were, in 1883, 17 gardens, and these gave the return

of 342lh to the acre at a cost of R24.

"Treathical Trans used at this Coffee Playtes.—The type coffee fruit is termed the "cherry." The succulent outer coat of the fruit is the "pulp," the unner adhesive layer the "parchment." The seed-coat within the parchment, which adheres closely to the seed, is called "the sile set sikin." The pulp is usually removed at the plantation, but it is a common practice for planters to send the "berry" or seed enclosed in its parchment to the coast town or even to Europe, in order that by special and expensive appliances it may be deprived of its parchment. This has been strongly recommended within recent years, as the extra cost of transport has been found to be more than compensated for by the better quality of the produce and the great facilities afforded in Europe for working the complicated machinery necessary for this purpose.

#### PREPARATION OR MANUFACTURE.

The preparation of the "berry" from the "cherry" may be said to be accomplished in the following stages: (1) Pulping; (2) Fermenting; (3) Drying; (4) Peeling, Milling, or Hulling; and (5) Sizing and Winnowing.

A volume might be written on the various systems and mechanical appliances that have been or are now employed during the various stages of coffee preparation. The primitive native system is to sun-dry the cherry, then to pound it in the common rice-pounder and winnow away the fragments of the dry pulp and parchment separated from the berry. Besides

of the pulp which surrounds the bean. This is most easily and effectively accomplished if the collections of ripe cherries made each day are passed through the machinery at one. If mano dably delayed, it may be necessary to ferment the cherries before they can be pulped. The most simple machine in use is that known as the "disc pulper." This consists of rotating discs the surfaces of which are concered with sheet copper roughened by having projections punched forward. A "single pulper of this description will pulp 2010 25 bushe's an hour and may be a orked by three cooless. A "double pulper" of this type has two such discs and is furnished with a feed in roller. It will pulp to bushelt an hour, and may be worked by from four to's ecooles, and double that amount if worked by

COCHIN.

1662 Technical Terms. 1663

MANUFAC-TURE.

Pulping.

COFFEA arabica.

## Area of Coffee Cultivation in India.

AREA AND OUTTURN Nilehiris 1659

"Coffee cultivation on the Nilghiris was reported on in 1872 A large area of land on the Nilghiris has proved to be admirably suited for the cultivation of the coffee shrub Not less than 22,897 acres are now under coffee plantations, besides 12,231 acres taken up for planting Twenty-five years ago the area under collee did not much exceed 500 This great increase is entirely the result of private enterprise, and has added much to the prosperity of the Nilghiris, while at the same time benefiting the districts immediately adjoining. In the establishment of these coffee estates a property has been created worth about 5 millions of rupees Of the total expenditure, about one third is for the payment of wages to cool es and most of the come ad at it ! minity, either in pay as cash carried bν Estimating that the sum sent into the low country in this way represents annually R6 00,000, this will support about 14,000 families of labouring people Moreover, in carrying coffee to the coast, and sorting, packing, &c, a large amount of other labour is employed Until a few years previous to 1850 the coffee plantations on the Nilghiris were found only on the eastern slopes, but they have now been extended to the southern, northern, and north-western slopes, there are also some extensive plantations in the Ouchterlony Valley and in the neighbourhood of Cooncor Coffee cultivation is also carried on on the Shevarov Hills in the Salem District, where nearly 6,000 acres are under the crop, and an area of 4,680 acres has been taken up for planting, on the Pulney and Shiroomullay Hills in Madura, where nearly 4,400 acres have been planted and a considerable he Tinnevelly and Combaare about 2,000 acres under

Coorg. 1650 In Coorg coffee is also extensively produced, for there are but few Europeans and natives there who are not interested in its cultivation

of Report

peans, and 4,594 by natives, comprising an area of 77,474 acres, or a little more than one thirteenth of the area of the whole district

each estate held by Europeans is 196 acres and by natives 8 acres. Of the whole area 40,350 are bearing, producing 6,125 tons of coffee, or on an average 3 cut the acre, but the average yield in most European estates, which are much better cultivated than native estates, reaches 2 cut the acre. Taking the average cost of cultivation at R120 per acre. European cultivation at R120 per acre. European cultivation at the rate per acre assumed above comes to nearly 32 lakhs of rupees. Of this - 12 care assumed above comes to nearly 32 lakhs of shaving beer

as name to the labourers, which very expended for labo

former State in 1885

he area under coffee in Fravancore seems to have declined considerably within the past few

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## Coffee Mannfacture.

COFFEA arabica.

years, or the returns are more nearly correct than they used to be In 1883 there were said to be 6,268 acres under coffee, with 4,353 acres taken up on the

AREA AND

7th,

feet with plateaux over 7,000 feet. The more important of these is part of the group known as the Anamallays" "The plateaux, by reason of their good cline, rich soil, abundant timber and water-supply, are likely to become better known as the demand for coffee-land increases. On plateau alone (Eroovimullay, or Hamilton's Valley) is 6 miles long by 3 wide, and contains about 10,000 acres of excellent tea and coffee land" In Cochin there were, in 1833, 17 gradens, and these gave the return

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1662 Technical Terms. 1663

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#### PREPARATION OR MANUFACTURE

MANUFAC-TURE.

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Pulping.

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COFFEA arabica.

Coffee Manufacture.

MANUFAC-TURE.

The discs work against smooth from beds so adjusted that the complete cherry cannot pass between They are torn upwards against the beds, and the projections on the discs tear off the pulp, allowing the beans to drop into one receiver and the fragmentary pulp to be carried into another. The disc pulper is in fact somewhat like the cotton gin which drags the fibre forward and drops the seed behind. The "cylinder pulper' is an older invention in its conception, but has been improved and perfected to a much greater extent than the disc, the latter, being light and cheap, is more generally used in new than in well-established plantations In the construction of a pulping house it is generally recommended to secure a hill side against which an excavition can be mide for This should consist of three storeys-a loft in which the cherries are spread out-the pulping floor or platform, and the cisterns By constructing this building against an embankment or steep cliff, the cherries may be carried direct into the top loft without requiring to be raised A good supply of water has also to be conveyed to the loft so as to descend with the cherries into the pulping machine in a continuous stream

edge,

into the eisterns. By means of sieves the cleaned beans are separated from the partially-pulped cherries, the latter being made to piss once more through the pulper. The stream of water and cherries is carried from the loft of a tube which dips to the bottom of a basin known is the hopper. Stones subside in the hopper, while the continuous stream from above causes the hopper to discharge a uniform supply of chernes and

water to feed the pulper.

Fermenting 1665

FPRMENTING -The parchment coffee, which may or may not have been assorted by contrivances in the pulper and sieves, has now to be fer-mented to remove from it the saccharine matter. If this be not accomplished it is difficult to dry the beans. By taking advantage of the descending flow of water, the beans are carried into tanks, and these tanks must in their turn be higher than the drying platforms on to which the fermented beans have finally to be dispersed. There are generally four fermenting tanks—two in which the fermentation retually takes place, and two in which the beans are washed. One of each is used for the produce of one day's pulping All the coffee pulped in one day is allowed to remain in the front or receiving cistern until fermenta-The period necessary for this will depend greatly on tion has set in the temperature of the atmosphere, but from 12 to 18 hours will generally The contents of the fermenting vat are then run into the washing cistern, and the receiving vat rendered available for another day's produce. By having two sets of these tanks the pulping operation may be carried out continuously, each day's collection being disposed of so as to When properly fermented have the pulper ready for the next day s work the beans are easily deprived of their saccharine matter by being driven from the fermenting vat by a goodly supply of water and thoroughly The size of the fermenting and washing washed in the washing tanks size of the plantation When poswood, the planks being not less than not so cold as stone or brick tanks,

#### Coffee Manufacture.

COFFEA arabica.

and are accordingly preferred. The tanks should slope towards the discharge openings.

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but sometimes asphalt is employed A simpler process is to harden the ground and cover it with a coir matting. This has the advantage of admitting of the surplus matting being thrown over the beans in the event of an occasional shower, but shed accommodation into which the beans may be rapidly conveyed is essential. During the drying, the beans have to be turned over repeatedly either by rakes or by the coolies feet. The difficulties against which the planter has to guard at this stage of the manufacture are too rapid drying cracking the beans, or a disproportioned drying through reckless turning or racking. To secure a better and more steady slow drying, various artificial continvances have been invented which are now employed by many planters, but the result is the same,—namely, the drying of the beans. Mr. Pasteur says. "On gardens and plantations cultivated by Europeans the cherry is removed as quickly

as possible aft going a very the berries ar

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many cases, I to put the free

sun the cherry dries quickly, and has then to be pounded to the great detriment of the colour as well as the quality of the bean, hence the difference between unwashed or ordinary pale and mashed or coloured or plantation coffee,—the taste of the washed coffee being, as a rule, much more delicate, and free from the earthness and common rough flavour of the unwashed

Pepinso or Milling —This consists of the removal of the parchment and silver from the beans As already stated, this operation is now chiefly effected by the dealers, at the port of shipment, and not by the planters Indeed, much has been written in favour of the beans being sent to Europe in parchment, and milling machinery is now in use in London for this purpose The following passage from Mrr. Pasteur's report will be read with considerable interest, and may be viewed as indicating a possible new direction of coffee enterprise —

"Among the samples of Wynaad coffee, those from the Eva Estate description of the Land of that crop having been despatched in parchment to be peeled and sized in London. The experiment has proved quite successful, the coffee represented by the sizes, 1st, 2nd, and peaberry, being fully equal in colour and appearance to the corresponding sizes prepared in India. The whole was sold at the same public auction—the

Peeling.

that cured in Central America

These experiments would tend to show that the parchment preserves in a remarkable degree the colour and the quality of the berry against the incidents or accidents of a land and sea transport. In the case of the Costa Rica and New Granada shipments cured in London, the berries seemed fuller and of better shape and weight than the others, as if (which is by no means improbable) the parchment left for two or three months longer than usual around the berries had acted as a kind of natural preserver, inside of which the berry had time, as it were, to mature more completely than when deprived of its outer and inner

COFFEA arabica.	Coffee Manufacture.
Manupac- Ture.	coating almost immediately after being picked. The curing requires machinery, motive power, drying grounds, delicate manipulation, and constant supervision; where any of those requisites fail, the coffee suffers in appearance, and consequently in value. Suitable machinery for treating parchiment has been erected at two of the London wharves, and there is every reason to hope that this is only the beginning of a new and profitable home industry. Growers will not be slow to perceive that the small increase of freight which they have to pay on parchiment is more small increase of freight which they have to pay on parchiment is more small increase of freight which they have to pay on parchiment is more small increase of the part of the payon to the same that the payon passed through the mill the beans require to be again heated. On the plantation this is generally done by exposure to the sun. The extent to which this is necessary depends greatly on the nature of the beans, and long experience is required to determine this point. As a practical hint it is generally laid down that they should be dried till they resist the pressure of the thum?
Sizing. 1668	SIZINO AND mill is subjected drives off the parchment and skin, leaving the clean coffee behind. After this it is separated into various sizes for the market. This has the effect of not only meeting the special demands of the consumers, but in furnishing a bean of uniform size that will admit of uniform roasting. Formerly this used to be done by the hand, but mechanical contrivances are now universally employed.
Packing. 1669	PACKING.—Having followed all the precautions and adopted all the most approved methods and appliances, the coffee producer, to secure the success of his labours, has now only to attend to packing. The beans must be saved from exposure to the air, or from being packed in cases that would impart a false arom. This is usually done by packing the produce in casks, care being taken to select timber that will not tain the
ADULTER- ANTS. 1670	ADULTERANTS AND SUBSTITUTES FOR COFFEE
	This in a large measure appears to be due to the registered against which has permitted a mixture to be sold so long as it is declared to be such. Criminality cot that contains anything t roasted chorry root itself substance applicable for the same purpose as chicary. No questions are therefore raised as to the ingredients of a mixture; and indeed, if recessing, such mixtures may This fact, together with the with coffee, it as given origin

#### Adulteration of Coffee.

COFFEA arabica.

ADULTER-ANTS.

Caramel

to a gigantic system of adulteration. The substances which are most generally employed are-"Ist-Roots such as chicory, dandelion, mangold-warzel, turnips,

parsnips and carrots, &c "and-Seeds such as beans peas, date-stones, mait, rye, &c

" ard-Burnt sugar, biscuits, locust-beans, figs, &c " (Bell, Chemistry of Foods )

During the proceedings of a Coffee Protection Association formed in London in 1886 the writer had the opportunity of examining certain wellknown mixtures and of seeing some of the practices of adulteration. One of the most curious which was brought to his attention was the use of artificially-prepared beans in so close imitation of the real article that the mixture of the spurious with the true coffee beans might be fearlesely ground in the purchasers' presence and sold as pure coffee This subject has already been alluded to under Chicory (see Cichorium Intybus, C Nos 1107 & 1103), and need not be elaborately dealt with in this place A largely consumed adulterant of coffee is a substitute for chicory known as machara. This consists of tipe figs dried, roasted, and pulverised. Burnt sugar is sometimes added to coffee in small quantities to give colour to the mixture, and from an idea that it preserves the aroma. Three or four pounds to the hundredweight might be admissible without being viewed as an adulterant When, however, roasted sugar or a sugar-yielding root (known as caramel) is added to a large extent, it becomes a serious adulterant, and perhaps one of the most extensively used of all adulterants It is to the roasted sugar contained naturally in chicory (caramel) that that ingredient owes its bitter flat our and aroma-properties which recommend an admixture of chicory to some consumers as a desirable addition to the This fact allows of extensive adulteration since the sugar contained in any other root will yield, when roasted, caramel bitter. Were saccharine roots the only adulterants employed in coffee, there might be less ground for urging the adoption of the French system which permits the grocer to sell separately chicory or any other substance which the con sumer desires to mix with his collee, but prohibits the vendor from manufacturing special preparations or mixtures. Roasted flour coloured with ferruginous earth is to some extent used as a coffee adulterant, and even roasted liver and other objectionable animal substances are said to have been found in coffee mixtures. A simple mode of detecting the presence of chicory or other caramel admixtures in ground coffee is to throw a little on the surface of a glass of clear water The readily solvent nature of the particles of caramel will at once impart coloured streaks to the water, while only after some minutes will pure coffee give its colour to the water

Date seeds were at one time supposed to be likely to come into use as a coffee substitute, and a company was actually formed to carry out this idea, without sufficiently reflecting on the means of procuring and collecting the seeds, supposing even that when roasted and ground they were found to possess in a sufficient degree the flavour and aroma of coffee The seeds of several species of Cassia have for centuries and are even now used by the inhabitants of trop cal countries in place of coffee. These do, as a matter of fact, afford when roasted and ground, a decoction which closely resembles coffee. The reader is referred to the account given under Cassia occidentalis (C No 784) for particulars of a coffee substi-tute which would seem to deserve more careful consideration. India could produce at a nominal price as compared to coffee, immense quantities of the so-called "Negro Coffee," if that article should be found to commend itself as a wholesome and cheap substitute for true coffee

COLFEA arabica.

## Coffee Mamifactore.

MANUFAC-TURE.

coating almost immediately after being picked. The curing requires machinery, motive power, drying grounds deligite manipulation, and in appearance and consequently in value in airs lady the codern suffers ing parchinent has been erected at two of the London wharees, and there is every tere in to hope that the is only the beginning of a new and profitable home industry Groners will not be slow to perceive that the small increase of freight which they have to pay on parchiment is more " -- rd price which the improvement in the them to o'tain" In the Kem Bu'

s of milling coffee in I urope, instead of at the plantation, are strongly urgen The emit of doing to it streed to be only as and 6d per cut (Report on the Cel and Ind. Establism, page 169.)

The prevest danger in preling consists in the fact that before being passed through the mill if e beans require to be again heated. On the plantation this is generally done by exposure to the sun. The extent to 1 of this is recessary depends presils on the nature of the Leans, and - -- " e mint As a practical hint it

sure of the thumt. result in serious 1 --

SIZING AND Sizing 1668 mill is subjected

drives off the parchment and skin, it will, a this it is a ...

of not ing a b

this used to be done up . . universally employed

1 at a various sizes for the market This has the Li Lu-

ers, but in furnishasting Formerly trivances are now

till they resist the pres-

Packing - Having followed all the precautions and adopted all the most approved methods and appliances, the coffee producer, to secure must be saved from exposure to the air, or from being picked in cases that would impact a false aroma. This is usually done by pricking the produce in casks, care being taken to select timber that will not taint the coffee. Bags are sometimes employed, but are inferior to casks, and the shipments of coffee should not be made along with cargoes of merchandise likely to injure the coffee

ADULTER-

Packing

1000

## ADULTERANTS AND SUBSTITUTES FOR COPPEE

Adulteration is never effected by the planter · indeed, it is practically impossible. Until the beans have been ground mechanical impurities such as mud and stones are the only admixtures that may exist in the coffee as it leaves the plantation. While this is so there is perhaps no other dietary article that is so much and so persistently adulterated as coffee This in a large measure appears to be due to the legislative system which has permitted a mixture to be sold so long as it is declared to be such Criminality consists alone in selling as pure coffee an article that contains anything but coffee Legally "chicary" may be the roasted checry root itself or the root of an allied plant or other vegetable substance applicable for the same purpose as chicory No questions are therefore raised as to the ingredients of a mixture and indeed if further protection to the manufacturer be necessary, such mixtures may even be registered as patent medicines. This fact, together with the long established custom of mixing clucory with coffee, has given origin

C. 1670

#### Adulteration of Coffee.

COFFEA arabica.

Caramei

to a gigantic system of adulteration The substances which are most ADULTER-ANTS.

"Ist-Roots such as chicory, dandelion, mangold-wurzel, turnips, parsnips and carrots, &c

"and Seeds such as beans, peas, date-stones, malt, rye, &c

"3rd-Burnt sugar, biscuits, locust-beans, figs, &c" (Bell, Chemistry of Foods)

During the proceedings of a Coffee Protection Association formed in London in 1886 the writer had the opportunity of examining certain wellknown mixtures and of seeing some of the practices of adulteration One of the most curious which was brought to his attention was the use of artificially prepared beans in so close imitation of the real article that the mixture of the spurious with the true coffee beans might be fearlesely ground in the purchasers' presence and sold as pure coffee This subject has already been alluded to under Chicory (see Cichorium Intybus, C Nos 1107 & 1108), and need not be elaborately dealt with in this place A largely consumed adulterant of coffee is a substitute for chicory known as mochara This consists of ripe figs dried, roasted, and pulverised Burnt sugar is sometimes added to coffee in small quantities to give colour to the mixture, and from an idea that it preserves the aroma Three or four pounds to the hundredweight might be admissible without being viewed ns an adulterant When, however, roasted sugar or a sugar-yielding root (known as caramel) is added to a large extent, it becomes a serious adulterant, and perhaps one of the most extensively used of all adulterants It is to the roasted sugar contained naturally in chicory (caramel) that that ingredient owes its bitter flavour and aroma-properties which recommend an admixture of chicory to some consumers as a desirable addition to the This fact allows of extensive adulteration, since the sugar conbeverage tained in any other root will yield, when roasted, caramel bitter Were saccharing roots the only adulterants employed in coffee, there might be less ground for urging the adoption of the French system which permits the grocer to sell separately chicory or any other substance which the consumer desires to mix with his coffee, but prohibits the vendor from manufacturing special preparations or mixtures. Roasted flour coloured with ferruginous earth is to some extent used as a coffee adulterant, and even roasted liver and other objectionable animal substances are said to have been found in coffee mixtures. A simple mode of detecting the presence of chicory or other caramel admixtures in ground coffee is to throw a little on the surface of a glass of clear water The readily solvent nature of the particles of caramel will at once impart coloured streaks to the water, while only after some minutes will pure coffee give its colour to the water

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Negro Colleg.

400	Dictionary of the Economic
COFFEA arabica.	Trade in Cossee.
ADULTER- ANTS.	the world article. It is to the world article. It is others int injurious .
COMMERCIAL TERMS. 1671	and pure collee.  COMMERCIAL TREMS AND QUALITIES.—The collee bean usually consist of two oval plano-convex seeds, though sometimes there is but one, which from its shape is known as the "peaberry." The commercial value of colle depends upon many circumstances.—form, size, colour, smell, flavour age, and uniformity within the sample. Form to some extent, though no always, depends upon the source: there are three commercial types as to form.—Mecha, small round peaberry; Bourbon, pointed and medium.
	· · · · ·
PRICES.	PRICES OF INDIAN COPPER.
1672	Mr. Pasteur, writing of the crop of 1885, says: "Taking oas, per cut as the average value of the bulk from the estates of time M sore type the Eoorg Mysore estates would be worth box. for bulk, the Nighm 83, the Coorg 82s, the Wynaad 82s, and the Travancore 70s, per cut.; whist native Mysore of average quality would be worth 63s, and native Coorg or Wynaad 60s, I range Irom 100s, to 135s, ing from 90s, of the other valued as higher the Market Mysore of the other of walke or merit. "Nowhere," he India and Jamaca, and its value, is
	wel
	cul say do of ant the coast 101 M1/ Inc manufacture to the coast 101 M1/ Inc manufact
TRADE.	TRADE IN INDIAN COFFEE.
1673	"India now stands first and foremost among Brutish possessions, both fuction" Disease has, however, "in shaken the strength of the trees, so esist periods of drought or of heavy regular crops have been the consequence, it would seem, thowever, as if plantations were gradually recovering their former strength, and with good cultivation and manuring

C. 1673

#### Indian Trade in Coffee.

COFFEA arabica.

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from 47,000 to 38,000. This has been accounted for by the fires which destroyed certain gardens, the imperfect returns, and the amalgamation of small gardens. The bulk of the coffee exported from India is washed coffee prepared under European supervision, many of the small native planters selling their produce to neighbouring European planters or to the

shown at the Colonial and Indian Exhibition, deplored the paucity of the samples shown of native Malabar coffee, and this subject would seem to commend itself to the attention of Government, since paying industries, adaptable to the cultivator with small means, seem to be much wanted.

washed or pale coffee; whils' fourths of the Indian, and o. as washed or green coffee." native Malabar coffee, says the Malabar coast have no

fu

Exhibition; they are quite suitable for our home consumption, and form an important item of the Indian production." The returns for the coffee districts of India show Madras to have nearly a third of its coffee area owned by natives, Coorg about one half, and Mysore fully four hiths. These facts give some idea of the extent of the probable production of

native or unwashed berry in India.

It is necessary to point out, before proceeding to discuss the returns of the foreign trade in British Indian coffee, that the town of Cochin itself is treated as British India, in the official trade returns, but the territory surrounding it as Native State. It therefore becomes necessary to add to the returns of foreign exports those from Cochin State and from Travancore State in order to obtain a correct idea of the total trade. The exports from these States during the past five years have averaged 20,376 cwt.

No statistics are available regarding the Indian inland trade in coffee. As regards the external trade, the average imports during the five years ending 1886-87 amounted in quantity to 25,300 cut and in value to cu t

howe. Coch

imports, Accordances inche through the Straits is the main source of supply; and next to it come Cevion and Aden. Bombay receives most

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COFFEA
arabica.
arabica
TRADE

### Trade in Coffee.

two largest cor coasting trade, within the press

Towards the close of the account given, on a preceding page, of the Towards the close of the account given, on a preceding page, of the History of Costee, Mr. Pasteur's statement regarding the decline of the Ceylon trade has been quoted. With the discontinuance of a large portion ceylon trade has been quoted. With the discontinuance of a large portion of the Ceylon cultivation the greatest hopes were entertained on a bright of the Ceylon cultivation the greatest hopes were entertained in 1885 to 1887, full the control of the

for 1885-86 us high level reveal; but ha is to take han foreign

upon this result 11.7 27 and to Zeylon industry. In as to take advantage of the decline of the Ceylon industry. In foreign advantage of the decline of the Ceylon industry. In a foreign trade in coffee has chronically fluctuated. It attained its highest recorded to post of the property of the capture of th

# COST OF CULTIVATION AND YIPLD.

a not that it scarcely falls within

cost. 1674

that have been autrinois are problematic; attories, and danger, in which dustry, after passing through an incubation of risk and danger, in which dustry, after passing through an incubation of risk and danger, in which severe losses have been sustained, is now firmly established Dr. Shortf severe losses have been sustained is now firmly account and for the cultivation of coffice, including purchase of land, tools, felling land for the cultivation of coffice, including purchase of land, tools, felling and for the cultivation of coffice, including purchase of land tools, felling planting, planting, touch-making, building planter's house clearing, luning, boiling, planting, road-making, building planter's house clearing, luning, boiling, planting, touch-making, building planter's house clearing, luning, boiling and coole lines, and keeping the same in order for three years, as fallows are

follows:-							7,160 3,300
ist year	٠	:	÷		•		4 400
2nd year	•	•			•		700
ard year	•	•			٠	•	1,830
	:	:		•	•		
Buildings and roads	·					TOTAL	17,450

This estimate, he states, is applicable to Coorg and Wynaad, more supervision. He proceeds to state that "the third year is supposed supervision. He proceeds to state that "the third year is supposed but we could not do better than keep on the safe side and take the proceed of an acre at 5 cmt. The 200 acres will yield 1,000 cwt. of conduction of the value of a cwt at R28 (that is given from the walle of a cwt at R28 (that is given from a conduction of 25h), the return will be R18,000, gwing a profit of cent is considered to the conduction of 25h), the return will be R18,000, gwing a profit of something the conduction of 25h.

#### Cost of Cultivation

COFFEA arabica.

the period of the first and the manager than the manager.

cost of the labour of preparing the beans

The author of the valuable article on collecplanting in Spons' Encyclepaisa gross several estimates both for India and for Colon. He states: "The following estimate fin rupees) for coffee cultivation in South India is based on the purchase of soon acros of forest land at R50 and 200 acros grass land at R25, bringing 200 acros of the former into full brings; labour, 4 annas a day, exclusive of mastires' wages." Then follows a balance sheet, the main facts of which may be expressed as follows:—

The 200 acres by the exercity year are brought under full bearing, and have not only clerred off the expense of the purchase and cultivation of the extage up to date, but the plantation has given its owner over and above Rigorji To continue to work it an expenditure of Rigorji To continue to work it an expenditure of Rigorji would be entailed, but the return from the crop would be about Rigorji on a year, so that with a portion of this the estate might now be extended to its full limits, 370 acres. This estimate has not only been framed to cover the charge of building all the necessary houses, but to furnish those with pulping and other machinery, and to stock the yard with too head of cattle and provide a horse for the superintendent. The capital necessary to organise such an estate (without having to obtain loans on crops) would thus be about Rigorjo, or 35 £5000, and during the fifth, sixth, and eventh years that sum would be recovered. Interest on

owner with smaller capital might do by working his own estate. The writer is, however, unable to verify these estimates; but since they have been framed by high-authorities, they mry be viewed as approximately indicating the possibilities of the Indian coffee industry when, with average seasons after the properties of the properties of the Indian coffee industry when, with average seasons after the properties of the Indian coffee industry when, with average seasons are the properties of the Indian coffee industry when we will be provided the Indian composition of the Indian coffee desirable to place alongside of these estimates, opinions of a styling classification of the Indian composition of the Indian and their presence and efforts gave a great impetus to coffee culture. The Indian composition is the Indian composition of the Indian and their presence and efforts gave a great impetus to coffee culture. The Indian composition is the Indian composition of the India

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COFFEA arabica.

Trade in Coffee.

TRADE

two largest consumers of Indian coffee. During the past five years the coasting trade which consists chiefly of despatches from Madras to places within the presidency and to Bombay, has averaged in quantity 70,000 cmt and in value R22 lakhs

Towards the close of the account given, on a preceding page, of the History of Coffee, Mr. Pasteur's statement regarding the decline of the Ceylon trade has been quoted With the discontinuance of a large portion of the Ceylon cultivation the greatest hopes were entertained of a bright future for the Indian coffee industry. Prices revised from 1885 to 1885, and during that period the exports to foreign countries maintained a higher level than during any previous consecutive period. During the

fell to 302,500 cmt. in 1876-77, and to 297,300 cmt. in 1877-78 The bulk of the exports go from Madrat (viz., 90 per cent ), so that the growth of the trade since 1807-68 down to the present date may be seen by a comparison with the Madras exports (given at page 473) from 1856-57 to 1867.

#### COST OF CULTIVATION AND YIPLD.

cost. 1674 So much has been written on this subject that it scarcely falls within the scope of the present article to deal with the various conflicting opinions that have been advanced. According to some writers the profits on coffee cultivation in India are problematic; according to others, the industry, after passing through an incubation of risk and danger, in which severelosses have been sustained, is now firmly established. Dr. Shortt in his useful Hand-book estimates the cost of opening 200 acres of forest land for the cultivation of coffee, including purchase of land, tools, felling, clearing, lung, planting, road making, building planter's house, and coolie bines, and keeping the same in order for three years, as follows:—

ist year										7,160
and year									•	3,300
3rd year			•			٠	•	•	•	4 460
Instrument	s	٠.			•		•	٠	•	700
Buildings	bas	roads	•	•	•	•	•		•	1,830
									-	

TOTAL . 17,450

This estimate, he states, is applicable to Coorg and Wynard, more especially the former, but he only allows R125 a month for European supervision. He proceeds to state that "the third year is supposed to make a return. The average produce of an acre is estimated at 7 cmt, but we could not do better thin keep on the safe side and take the produce of an acre at 5 cwt. The 200 acres mill yield 1,000 cm of of coffee beans, and if we take the value of a cwt at R26 (that is giving R7 to the maund of 25%), the return will be R18,000, giving a profit of cent. After the third year the average expense will not exceed R5,000 on a well-managed plantation, and the profit subsequently will be something fabulous?" No allowance is made for the purchase of pulping machinery,

#### Cost of Cultivation.

COFFEA arabica.

the erection of a pulping-house, and other accessaries to the preparation of the bern, but To. Shortt adds with reference to this that "these will at best form but a small term." But he has omitted apparently to estimate for the purchase of grass and forest land, and to take into consideration the coat of the about of preparing the beam.

The author of the valuable article on collee-planting in Spons' Encyclofacia gives several estimates both for India and for Ceylon. He states: "The following estimate (in rupees) for collee cultivation in South India is based on the purchase of 300 acres of forest land at R50 and 200 acres gives land at R25, bringing 200 acres of the former into full bearing; labour, 4 annay a day, exclusive of maistires' wages." Then follows a balance sheet, the main facts of which may be expressed as follows 100.

The 200 acres by the seventh year are brought under full bearing, and have not only cleared off the expense of the purchase and cultivation of the estate up to dite, but the plantation has given its owner over and above R15.971. To continue to work it an expenditure of R25.632 would be entailed, but the return from the crop would be about R5.4000 a year, so that with a portion of this the estate might now be extended to its full limits, 200 acres. This estimate has not only been framed to cover the charge of building all the necessary houses, but to furnish those with pulping and other machinery, and to stock the yard with 100 head of easile and provide a horse for the superintendent. The capital necessary to organite such an estate (without having to obtain loans on crops) would thus be about R25.000, or say £5.000, and during the fifth, sixth, and seventh years that sum would be recovered. Interest of

framed by high authorities, they may be viewed as approximately indicating the possibilities of the Indian coffee industry when, with average seasons and fair prices, the speculation is entrusted to careful and skillul supervision. The hopeful prospect this presented might, however, proce visionary through causes which not even a just and fair estimate could have taken into consideration. The highest hopes were once enteriamed of Indian coffee-planting, and set large sums of money have been lost. It is therefore desirable to place alongside of these estimates, opinions of a very different character. Dr. Bidde says: "From ten to twelve years ago (1857-1859), the high price of land, and the flourishing state of coffee culture in Ceylon, induced planters from that island to come over to India, and their presence and efforts gave a great impetus to coffee culture. The

such contingencies as bad seasons arrest to be the form of moderate means joined in the won savings without a doubt as to

tion established joint stock companies, spent takins in the purchase of

COFFEA Diseases of the Coffee Plant arabica PROFITS. ready made estates, and pleased their own minds and those of the other shareholders with visions of 50 or 60 per cent of profit. As might have . I, the antithe 50 or 'eed, these adventures have, from various causes, proved complete failures, the balance always being on the wrong side; and, taking them as a whole, the results have been such as to render the public distrustful of coffee culture as a safe or profitable investment, and to lower greatly the value of estates" (Report on the Riviges of the Borer on Coffee Estates) DISCASES OF THE COFFEE PLANT. DISEASES. 1675 141. 7 The number of disease many depending on clim all more or less local, at belong the Canker which believed to be due to want of depth of soil, but el mate and bad cultivation may have also to do with it Rot or the withering of the young leaves is due to wet and cold There are, however, certain specific diseases some of which have practically baffled both the planter and the scientists, and have proved so dis-Cooke, Balfour, &c. To review even briefly all that has been written on the diseases of the coffee plant would take up far more space than can be afforded in the present outline of the coffee industry. It may be said that the specific diseases are referable to two sections-Fungoid and Insectiform of noord ın nce

trix, an organism allied to mould thatisches it comes as in the form of spots or blotches, at first yellow, but which ultimately turn black. These spots are c

eventually extend over the whole

with little success If powdered sulphur, alone or mixed with caustic time, be blown over the plants and scattered on the ground below the boughs, the disease is prevented and the coffee plants seem at the same time to be benefited This, however, expensive and is more a preventative than a cure. When once the disease has taken hold of the leaves nothing has yet been discovered that will destroy t without at the same time tilling the leaves.

the ta-

(b) Leaf rot or Candelillo is a disease attributed by Dr. Gooke to the fungus Pelicularia Koleroga, Cooke. It is prevalent in Mysore plantat on July, the leaves, flowers, and betries becoming covered with a shiny

#### Diseases of the Coffee Plant.

COFFEA arabica. DISEASES.

gentinous substance which turns black about the time that the affected parts fall from the plant (Kew Reports, 1879, 30, and 1880, 35)

II. Of the INSECTIFORM diseases met with in India the following are the a tick or a most ten blas-

> orm" and " coffee in Coorg and the

It has been determined as the beetle Xylotrechus quadrupes. It is red or yellow, with black in transverse lines. It damages the trees by boring holes into the stem usually a few inches above the ground. These passages are at first transverse, but soon ascend spirally to the growing tip where the larvæ are matured The plant early shows signs of death, and ultimately withers down to the point where the beetle entered. This pest is most prevalent in hot exposed gardens, and may be kept in check by free irripation.

(d) Bugs - Vanous insects are by the planters called bugs. They belong to the same family as the lac and cochineal, ers., Coccide There are three pests of this nature, known as the "brown," "black," and "white" bugs. The brown bug has been determined as Lecanium coffee. This establishes itself on the young shoots and buds, which it covers with a scaly incrustation in which the larvæ are developed. This causes the destruction of the parts to which it adheres, the flowers and young fruits falling freely. The pest does not do much harm, however, until it has been two or three years on an estate It prefers cold damp plantations at about 3,000 feet in altitude This bug may be first recognised as brownish wart-like bodies. These are the females each of which produces some 700 eggs. Fortunately this pest is freely attacked with parasites which greatly help the planter.

The black bug is kno attaches uself to the 1 altıtudes ın damp sıtuatı shell When the eggs

the young bernes. what like a wood-It is flat, oval, ng across the back

It seems to prefer hot dry plantations and disappears with the rains, only to return in time to destroy the setting of the fruits. It is found on the roots about a foot below the surface of the soil, in the axils of the leaves, and among the clusters of flowers and young fruits It mused by the white excretion formed around the larvæ It may be easily recog-

All these and the other less known coffee-bugs have a strong dislike to tobacco juice. They may be prevented from developing to an injurious extent by brushing the twigs with tobacco. Some planters recommend saltpetre and quicklime in equal proportions dusted on to the affected parts, or a washing with a preparation of soft soap, tar, tobacco, and spirits of turpentine. Mr Neitner says that a bug of some kind exists on all estates: "Am I wrong," he asks, "in saying that if there was no bug in Ceylon, it would, at a rough guess, produce 50,000 cut of coffee more than it actually does?" Balfour explains the action of the bug as stopping up the pores through which respiration and transpiration take place, thus preparing the way for "the fungus which never fails to attend on the bug."
"Me. Neitner tells us that several means of checking the extension of the bug have been proposed and tried. Amongst these the introduction of the red ant; but their bites are so fierce and painful that the coolies refused to go amongst the trees while the ants were there. Rubbing off the bug COFFEA arabica.

DISEASES.

Diseases of the Coffee Plant.

by hand has been tried, but it can only be attempted upon young trees without crop; and Mr Nietner, although allowing that an immense quantity of bug is thus destroyed, is nevertheless of opinion that the effect is but trifling. He thinks suggestion, although he results have been achies pear to have the effect e on locality, Mr Nietner

reduction in acreage were counterbalanced by a higher system of cuiti vation universally carried out, the bug would not be so numerous as it now is " (Balf Cyclop)

appears ht comes er. local.

preferring certain parts of the estate but does not comme its lavages to the coffee plant only, as it eats any cultivated plant-regetable or fruit treebut despises weeds. It is very destructive to young plants. Mr. Nietner states that he lost as much as 25 per cent of his seedlings through this pest. The "White Grub "this includes the larve of several species of Melolonthidæ or Cockehafers These do much damage by eating the roots of the trees Mr Gordon considers them as one of the greatest eneroots of the trees

mies to coffee planting

(f) Other Pests - The Locust does of course much injury when present to any great extent, but this is more an accidental and occasional than a regular pest thev are not very pr pulp

and drop the b berries form the so called Jacker Co ic

## COFFFE-LEAP TEA

It has long been known that coffee leaves, if cured by a process similar to that adopted with tea leaves, afford a beverage which contains sufficient caffeine to entitle it to a position as a cheap substitute for tea or coffee. Indeed according to some writers, the leaves contain more caffeins than the berries. A decoction from the leaves is said to more caffeine than the berries be regularly used by the inhabitants of Sumatra especially at Padang A Mr John Gardener of London even patented a process for manufacturing and partially roasting the leaves, from the behel that they were likely to come in tes leaves have an unplea abat aphances of

> mercial article. But for this tack as compared with tea at 10d d for this work by Prof Warden

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ord to

"Coffee contains about \$ to 2 per cent of a white crystalline principle caffeine, which is similar in composition to the alkaloids, theme, contained A small quantity of volatile oil is contained in coffee, but during

#### The Uses of Coffee

COFFEA arabica.

the roasting of the berries a larger amount is developed, to which the aroma is due. Casseine appears to act as a sumulant to the nervous system Cosses leaves have been used as a substitute for the berries: they contain casseine Mr M M. Ward of Padang writes regarding the use of the coffee leaves as follows: "I was induced, several years ago. from an occasional use of the coffee leaf, to adopt it as a daily beverage, and my constant practice has been to take a couple of cups of strong infusion with milk in the evening as a restorative after the business of the day . . As a beverage the natives universally prefer the leaf to the berry, giving, as a reason, that it contains more of the bitter principle, and is more nutritious," The best mode of roasting is by holding the leaves over a fire made of dry bamboo or other wood which gives little smoke. When sufficiently roasted the leaves have a buff colour; they are ground to a powder and used in the same way as coffee. (Hanbury)

#### COFFEE PULP.

COFFEE PULP. 1677

It has long been known the .... contains an amount of sugar which alcohol At present the washin . off and no advantage taken of the . iters have urged the planters to utili - inite steps have been taken in that direction It is indeed even questionable whether or not it would pay the planter to divert his attention to a perfectly distinct enterprise. The tendency of the present day is to enable the manufacturer in every branch of industry to compete to the last degree by affording him the means of deriving additional revenue from the waste or by-products of his industry. In this light it seems possible that collee pulp may come to be put to some useful purpose. It contains much mucilage, with gum and sugar. It is said that in Arabia the pulp is actually employed in the preparation of a pleasant beverage. The pulp is allowed to dry on the fruit and then husked This husk is · iischer husk,

tion i husk

OII.

1078

The term "Coffee-o1" is in the trade given to palm-oil in which the kernels have been more or less burnt during the process of extraction, The oil thus obtained possesses the odour of coffee; hence the name. At the same time the roasted beans of coffee possess an essential of to which indeed they owe their aroma. During the process of roasting a large proportion of this essential oll is given off, and it has often been proposed that the drums employed in concer using should be connected with an exhauster so as to condense their oil in a receiver. By this means the aroma might be respect to the coffee or emplined to favour liqueurs This empireumatic of is formed during the masting, and probably at the expense of case ne and other constituents of the coree (see under Chemistry).

#### MEDICINE.

MIS'CINE 1679

Collect while are off inal in the Botish Praema operating on that of the Un od Sator of America. Mary med all mem, brance, team mend is use in Ingland from dance ons les deters property, as a

ļoo	
COFFEA arabica.	The Uses of Coffee,
arabica.	stimulant to the nervous and vascular system, is that upon which its claims to medicinal recognition depend. It produces a feeling of busyancy and exhibitant resembling the first effects of alcohol, but it is not followed by depression and collapse. It increases the frequences of the pulse, and stimulates the system to throw off feelings of fatigue, or to sustain prolonged and severe muscular exertion. It has even been contended that caffeine has the power of checking the waste of the issues: Lehmann found that the distilled oil had this effect in quite as strong a degree as tea. The well-established property of coffee in preserving encross system, pression on the roots excitement increased vigour follows on the use of most other stimulants. Moleschott found that it cannot be a support of the brain are manifested without congestion or inflammation.
	acquired much as been recommended in hoping-cough and in hysterical affections. "Hayne informs us that in a case of violent spasmodic disease, pulse so much mediate relief antispasmodics."  Dewces it was with coess.
	s characteristic wer in a great fi the primary 1 differs in its 0 the nervous 5 efficient as a quence of the peccially black the cannot use stomach. In t agreeable to wever much it in a lever, and rapeutics and rapeutics and

with one or beneficial effe

### Chemical Composition of Coffee

COFFEA arabica.

MEDICINE. coffee in France is supposed to have abated the prevalence of gravel in In the French colonies, where coffee is more used than that country beverage. ın t

> r, but it is he effect of

muc mposing animal and beneficial application

not

coffee, burnt in the wards of a hospital early in the morning, is a deodoriser, and a very fragrant one" (P Lensley, Honorary Surgeon, Chicacole, Ganjam, "Is also an antisoporific, when consumed in large Madras Presidency) quantities, is supposed by the Arabs to have an anaphrodistacal effect.

(A S G Jayakar, Surgeon-Hajor, I M D, Muskat, Arabia) "Dried coffee roasted in an open vessel is a useful deoderant" (Henry David Cook, Surgeon-Major, Calicut, Malabar). "Is an antidote in opium-poisoning" (G. A. Watson, Allahabad)

CHEMISTRY.

The roasting or torrefying of the coffee-beans, combined with the pulverising they are afterwards subjected to, induces certain changes to which in a large measure the flavour and aroma of the coffee are due The woody tissue becomes friable, and at the same time certain chemical changes take place The chief organic constituents of raw coffee are caffeine, fat, caffeic acid, gum, saccharine matter, legumin, and cellulose

Payen gives the following analysis -Cellular tissue 34 000 Hygroscopic moisture 12 000 13 000 Starch sugar, dextrin, and vegetable acids 15 500 Legumin Chlorogenate of potash and caffeine 10 000 5 to 5 000 N trogenous matter 3 000 Free caffetne 0 800

Th ck insoluble ethereal oil 0.001 Aromatic oil 0 002 Mineral constituents 6 697 Bell (in his Chemistry of Foods) gives the following table of the

analysis c' ist Indian coffees comparıson betwe chemical

changes effected by roasting -Мосна EAST INDIAN Constituents Raw Roasted Raw Roasted Caffeine \$ o8 82 1 11 1 05 Saccharine matter 9 55 8 46 8 90 9 58 43 41 Caffeic acids 4 74 4.52 Alcohol extract, containing a trogenous and colouring matter 6 90 14 14 12 67 Fat and o l 12 60 13 59 11 81 13 41 Legumin or albumin 9 87 11 23 11 23 13 13 Dextrin 87 1 24 1 38 Cellulose and Insoluble colouring matter 37 95 49 62 38 60 47 42 4 88 3 74 8 98 4.56 3 99 Moisture οõτ ioo 9 64 100 00 100 00 100 00 100 00

CHEMISTRY. 1680

#### COFFEA arabica.

#### Chemistry of Coffee.

#### CHEMISTRY.

Should the whole of the testa of the seed (the silver skin of the planters) not have been removed, it separates. This is known as the roaster's "flights removed from the beans before submitting

being roasted the beans swell up and lose from 15 to 20 per cent of their weight. There is perhaps no operation of so much importance as that of roasting. It should be performed in a covered vessel, over a moderate fire, and the seeds should be kept in constant motion. If mixed sizes are roasted together, the coffee will be much inferior to that obtained by roasting carefully picked and assorted beans. The degree of roasting required for one class of coffee is not the same as that for another. The heat should not be greater than is sufficient to impart a light-brown colour to the bean. When roasting is carried too far, a disagreeable smell and a bitter and acrid taste gradually mingle with the essential aroma, and thus lessen the ment and value of the coffee By reducing

right extent, the volatile oil is ne other constituents. A glance at the whole of the saccharine matter

or other

colour-

cane-sugary leiding roots, as compared with pure coffee. There is something altogether peculiar in the behaviour of the sugar of coffee under the influences of torrefication. How the volatile oil is formed seems to be a puzzle. This oil has been termed Caffeone, and it is the aromatic principle of coffee. It is wholly the product of torrefication, the materials of which it is formed being obtained by the destructive influence of heat on the

which the infusion of tea as a 2. Ho N. O.) is, however, the coffee depends, and it does t is identical with the alkaloid about twice as much theine On this account a greater

which contain the glutinous matter of tea Several prosecutions have been

old, is far inferior to the continental

and granding his own coffee in small

quantities as required.
Structure of the Wood -Wood white, moderately hard, close-gruined.
Pores very fine and extremely fine; medullary rays very fine, numerous,

TIMBER. 1881

#### Liberian Coffee; Job's Tears Kœnigii. LIBERIAN COFFEE This is the Coffea liberica, Hiern, a native of Liberia, Angola, Goseveral other parts of West Tropical plant than C. arabica, yielding also t made known to Europe about the s appearance in Ceylon. Its hardier growth led to the opinion that it might be able to withstand the action of the fungus, and on this account demands poured in to the Royal Botanic Gardens of Kew for plants or seeds to be experimentally tried Fortunately the Director of the Gardens was fully able to meet these demands until the question of seed-supply was taken up by certain recognised merchants. The Kew Reports are full of the most interesting details regardseen Mr. ihomas

have toned down considerably, leaving the matter still in an experimental position.

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COIX, Linn ; Gen. Pl., III, 112.
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Tears "

Coix gigantea, Koen , Duthie, Fodder Grasses, N Ind , 18 ; GRAMINEE

Vern .- Kesai, BERAR, Danga gurgur, BENG

Reference - Roxb , Fl Ind , Ed C B C , 650

Habitat -A tall, erect, aquatic grass, with large broad leaves, found hed from the next species the central one stalked mountains, but from his

im C. aquatica, it seems

the vigorous growth, sease of the Liberian

probable that both are referable to one species, if, indeed, they should not be treated as varieties of C. lachryma

It seems probable also that C. gigantea and C aquatica are the wild states of the cultivated plant, C. lachryma At all events, no one seems to have observed them under cultivation, and thus, while the grains are not apparently eaten, the other properties of Coix lachryma are applicable to the above.

C. Koenigii, Spreng., Duthie, Fodder Grasses, 10. Syn. for Chionachne Barbata, R. Br (the Coix Barbata, Roxb)

COIX LIBERIAN COFFEE. 1682

1683

1684

#### COFFEA arabica.

#### Chemistry of Coffee.

#### CHEMISTRY.

Should the whole of the testa of the seed (the silver skin of the planters) not have been removed, in separates during the process of crasting. This is known as the rorster's "flights:" or the "fibre!" it should be removed from the beans before submitting these to the grinding mill. On being roasted the beans swell up and lose from 3 to 20 per cent, of their weight. There is perhapt no operation of so much importance as that of roasting, it should be performed in a covered vessel, over a moderate fire, and the seeds should be kept in constant motion. If mixed sizes are roasted together, the coffee will be much inferior to that obtained by roasting carefully picked and assorted beans. The degree of roasting required for one class of tofice is not the same as that for another. The heat should not be greater than is sufficient to impart a light-brown colour to the bean. When roasting is carried too far, a disagreeable smell and a bitter and acrid taste gradually mingle with the essential aroma, and thus lessen the merit and value of the coffee. By reducing disagreed with the control of the coffee.

destroyed, when the volatile oil is ents. A glance at a saccharine matter in chicory or other of the tapid colour-generating of the collect. There is somesugar of coffee under is formed seems to be a the aromatic principle the materials of which

it is formed being obtained by the destructive influence of heat on the other constituents of coffee. Though present only in minute quantities, this empyreumanic of exercises a powerful influence upon the animal economy. This activity of the volatile oil of coffee justifying us in commonly the control of the volatile oil of coffee justifying us in common the control of the volatile oil of coffee justifying us in com-

on this account a greater beverage than of tea. The bout 13 per cent. of nutri-

thus the full have strongly whether this

in stock pursue
in stock pursue
the consumer which may be years old, is far infenor to the consumer
system of the consumer toasting and grinding his own coffee in small

quantities as required
Structure of the Wood -Wood white, moderately hard, close-grained,
Pores very fine and extremely fine; medullary rays very fine, numerous.

COIX Liberian Coffee: Job's Tears. Kœnigii. LIBERIAN COFFEE. LIBERIAN COFFEE. 1682 This is the Coffea liberica, Hiern., a native of Liberia, Angola, Go-lungo, and Alto, and probably also of several other parts of West Tropical Africa, It is a taller and stronger plant than C. arabica, yielding also a larger leaf and berry. It was first made known to Europe about the time the coffee-leaf disease made its appearance in Ceylon. Its hardier growth led to the opinion that it might be able to withstand the action of the fungus, and on this account demands poured in to the Royal Botanic Gardens of Kew for plants or seeds to be experimentally tried. Fortunately the Director of the Gardens was fully able to meet these demands until the question of seed-supply was taken up by certain recognised merchants. The Kew Reports are full of the most interesting details regard. ing the success which attended the experiments made in almost every part ause it to supplant the Coffea arabica the cottee planters of I position. COIX, Linn.; Gen. Pl., III., 112. A group of grasses belonging to the tribe Mayneze, and popularly known as "Job's lears" Under that designation is included not merely the species of COIX but of CHIONACHNE, and probably also of POLYTOCA. The latter are considered, and program also of POLYHOCA. The latter are not of such importance as to justify their separation in a work treating purely of economic products, and therefore the popular or rather practical waw of these plants will be adopted in the following brief account of the species of "job's lears." Coix gigantea, Koen.: Duthie, Fodder Grasses, N Ind., 18 : GRANINES. 1683 Vern. - Kesas, Bergr; Danga gurgur, Beng. Reference .- Roxb , Fl Ind., Ed C. B. C . + 50. Habitet - A tall arms -- -- -- -- . s. found thr species bγ stalked. Rorom his des t seems probable that both are referable to one species, if, indeed, they shou'd not be treated as varieties of C. lachryma It seems probable also that C. gigantea and C aquatica are the will states of the cultivated plant, C. lathryma. At all events, no one seems to have observed them under cultivation, and thus, while the grains are not apparently eaten, the other properties of Coix lathryma are appli-

1684

C. Konigii, Streng.; Duthie, Folder Granes, 29.
Syn. for Chioxachus barbata, R. Br. (the Coxx barbata, Fost)

cable to the above.

Job's Tears.  Kurz in his report on Pegu refers to this plant under the Burmese in Kyaip It is also known in India, where it bears the following very names Gurgur, Beng , Bhut, kirma-gilaram gadi, Chanda , a Baladhari, C. P.; Varierad, Man., Orbita gadi, Tell.  Fodder,—Duthle says that in Balaghât in the Central Provinces said to be used as fodder when in the young state Roxburgh, how remarks that, owing to its coarse nature, cattle do not eat the grass.  Coix lachryma, Linn.; Duthie, Fodder Grasses, i8.  Job's Tears.  Syn —C Arundinacea, Lamk, Lithaorostis, Lachryma Josi, G.	iacula Kadpi , it 15 vever
Kyaip It is also known in India, where it bears the following were thames Gurgur, Beng , Bhus, strmaglaram gadi, CHANDA, i BALAGHAT, C. P.; Varival, MAR., Chella gadi, TEL.  Fodder.—Duthie says that in Balaghât in the Central Provinces said to be used as fodder when in the young state Roxburgh, how remarks that, owing to its coarse nature, cattle do not eat the grass.  Coix lachryma, Linn.; Duthie, Fodder Grasses, 18.  Job's Tears.  Syn —C Arundinacea, Lamk, Lithagrostis, Lachryma Josi, 6.	iacula Kadpi , it ii vever
said to be used as fodder when in the young state Roxburgh, how remarks that, owing to its coarse nature, cattle do not eat the grass.  Coix lachryma, Linn.; Duthie, Fodder Grasses, 18.  Job's Tears.  Syn—C Arundinacea, Lamk, Lithagrostis, Lachryma Josi, 6.	vever
Job's Tears.  Syn — C arundinacea, Lamé, Lithagrostis, lachryma Jobi, G	
Syn — C ARUNDINACEA, Lamk, LITHAGROSTIS, LACHRYMA JOBI, O	
Syn -C ARUNDINACEA, Lamk, LITHAGROSTIS, LACHRYMA JOBI, G	
attributed to the various species of Coix, would become necessary. One most remarkable of the forms of Coix lachryma has been figured last part of Hooker's Icones Plantarum, Pl, 1704, as C lachryma,	esting much there rears, his be of the in the var.
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Hooker's Him Your, II, 259  Habitat.—Met with on the plains of India, and on the warm slopes  C	
	which the writer has placed under the above species. Should if proved incorrect, a certain redistribution of the verrouslar names, attributed to the various species of Coix, would become necessary. One most remarkable of the forms of Coix, lackingma has been agured last part of Hooker's Icones Plantarium, Pl. 1704, as C. lackingma, the second last part of Hooker's Icones Plantarium, Pl. 1704, as C. lackingma, the second last part of Hooker's Icones Plantarium, Pl. 1704, as C. lackingma, the second last part of Hooker's Icones Plantarium, Pl. 1704, as C. lackingma, the second last part of Hooker's Illim February, II, 1859  Habitate—Met with on the plains of India, and on the warm slope's Habitate—Met with on the plains of India, and on the warm slope's

#### Inb's Term

COIX lachryma

tea, and appear to occur at higher altitudes. They are also more stunted in growth, and the involucre (or shell around the grain) is looser, softer, and apparently always furrowed—at least this is so with all the cultivated forms.

The Forms of Joa's Tansa.—There are three of four well-marked forms of Job's Taras met with in India, which differ from each other in shape, colour, and degree of hardness, and in the presence or absence of grooves or furrows along the length of the hardened involuce. As to shape there are three types—a long of induced or tubular (our, step-

FORMS OF. 1687

regarding these.

1st—1 he cylindrical form is returned as frequently cultivated, and also wild in the Pegu Divisions of Burma (in the following districts—Prome,

I toun no otner part or Assam, nowever, nave samples of this from been received, but in the part of Hober's Icones Plantarum (to which reference has been made above) it is stated that "Mr. R. Bruce of Balpara" forwarded samples to the Bruish museum, with a note to the effect that the "involucres are known to 'the Assames and the Miris, and called by them the commonce or crow-bead, from the fondness of these birds for this berry," It would appear, therefore, that the cylindrical grain may occur in the Miri country, but up to date (in connection with the present enquiry) no information corroborative of this fact has been received from Assam, and the plant does not appear to occur in any other part of India, so that it may safely be viewed as a native of Burma, and possibly distributed into the mountain tracts of Upper Assam and Cachar.

food

and—Of the pear-shaped form there are numerous sorts, varying in size and colour—some pale and blussh white; others grey, yellow, or brownblack. They are often constructed at the base into a disk-like annulus, and in all the samples said to be collected from cultivated stock, the grains are more or less deeply furrowed, and in the slate-coloured samples the bottoms of the furrows are of a brown shade. The cultivated forms are also loose-shelled and flattened on one sade, somewhat obliquely, like the smaller cardamom. The wild forms are smooth-shelled, the shell being often so thek and hard that it can scarcely be broken. The cultivated

extensive and varied series of cultivated Coix.

ord. Of the flattened school dell and all are smooth head shall and

described above.

494	Dictionary by the Blonomic
COIX lachryma,	Job's Tears.
FORMS OF.	i the shell to from that of
	roid forms sent from Hanthawauuy some and perforation, making them pink, smooth, and shining, with a natural central perforation, making them look like artificial beads. A brown sample from Akyab is so hard and shining as to closely resemble small marine shells. I he Deputy Commission of the performance of the perfo
	the means of recording the verman will afford to the various wild and cultivated plants.
BURMA,	Prou Division.
Pegu. 1688	hvo forms exist: a large pear-shaped kind known
	white, the other brown grey, which is a division of the control of
	C. 1688

# Job's Tears. COIX lachryma.

Commissioner deals in his repo t with a much more extensive series than he has furnished samples of. He says the forms of Cox are known collectively by the name Kyrikhi. The cylindrical being Kyrikihe (literally,

are names to distinguish certain to Kink; Sakreek, edible Kyeek;

all the forms are known by the Burmers name Kreithis, but that a large round ed ble form is known to the Karens as Ri, and is cultivated, while another smaller round kind is known as the Be-ma (or female Re) and is collected for ornamental purpose. He further forwards a sample of the cylindrical grain, and says it is known as the Be two.

#### ARAKAN DIVISION.

In the Alyab Dutinet, the pear-shaped form is both wild and cultivated. From the town of Alyab, the Deputy Commissioner his furnished three samples of the wild plant, the seeds being smooth, polished, and very hard, especially a brown form. He states that there forming row in the low murshy lands and are not exten. He, however, furnished a sample of a cultivated form obtuined from Mythoung—the Ingrest Cox, grain yet examined—which fully supports all that has been stried above. It is steel grey, deeply grooved, with a loves shell and pronounced basal swelling. The Deputy Commissioner describes this as "the cylindrical form," but while it is certainly longer than the Alyab grain, it is not the cylindrical form (rer, stenocarps) described above, but is a monster form of the ordinary cultivated per-shipped grain.

In the Kysuk-tya District three forms of Cox occur—two wild and one cultivated. The writer has not seen any specimens of these, yet has no reason to doubt but that they would answer very much to the types described under Akyah. One of the wild forms is larger than the other and is known as jassee or kalimite, while the smaller form is the chittee. The edible form is also known as a chittee, and is both eaten and made into beer.

#### TENASSERIM DIVISION.

In the Amherst District both the round and cylindrical forms are grown, the former being eaten, and the latter used for ormanening ladies' diesses A wild round form is said also to exist Samples have not been communicated, but the Deputy Commissioner reports that both are known as knet

In the Shar-gyan District no form of Coix is known

In the Taungingu District it is stated that the cylindrical form grows wild, while the globular is cultivated, both are known as kyet; the former is used for ornamental purposes, and the latter is grown as an article of food and for making beer.

In the Taungingue Comment of the control of

others are smooth and shining

(1) Kalesk is a dark brown or bluish black polished grain of the pear shaped series.

Arakan. 1680

FORMS OF.

Tenasserim. 1690 496 COIX Iob's Tears. lachryma. FORMS OF. (2) Kaleik Kauk-nyin, the same as the last so far as the appearance of the grain goes. (3) Pale ( Com. ) . (4) . grain in " ation; i Deputy (5) Kalerk roidal, s Hanthawaddy sample marked D, but of the same shape. The seeds are less than a tinch in diameter and not much more than half that size in thickness through the central perforation. (6) Kalesk Yaing, the form of stenocarpa that has been described as (7) : of the steel grey whites are quite as large as No. 7, but few of the straw-coloured ones approach it in size, In the Salween District both the globular and the cylindrical form is cultivated, but the former exists also in a wild state. They are known in Burmese as kyest, the cylindrical being headened and the olohular In the Shan language cylindrical and Malweleitamun, the the cylindrical, and Bowma, the globular; also in Malenini Autese und cylindrical and Tabusè the globular. Both forms are extensively grown in the Shan States, where the cylindrical is sold for RI a bushel and the globular from 4 to 6 annas. The following abstract of available information regarding Coix cultivation in Assam may be here given to complete this brief review of the subject :-ASSAM. Sir J D Hooker remarks: " A great deal of Coix is cultivated in the 1691 Khasia hills; the shell of the cultivated sort is soft, and the kerrel is sweet, whereas the wild Coix is so hard that it cannot be broken by the teeth, each plant branches two or three times from the base, and or or yard of soil; the produce Cabe, the Deputy Commission of this district cultivate ie is Ka-si, and the varieties

"Sibu."—The seed is of a bluish grey colour and pear-shaped in but some-

> ndrical in in being riction. set brown rain, with ly hard to

admit of its being used for ornamental purposes "Sanapre' - Pear-shaped in form resembling Sipia, but smaller in size. This dark brown regular grain looks at first sight remarkably like some of the forms of black rice. It is about the same size and is pointed at both extremities. It is considerably like an elongated caraway.

#### lob's Tears

COIX lachryma. FORMS OF

"'Kıdatha' '-Almost zlobular in form, of a mottled brown and grey colour. The most marked peculiarity of this grain is that it is dark brown like the Sibia form in the lower half and yellow or straw-coloured in

the upper "'Aası' '-Globular n form of a light grey or yellow colour. This is the

most common variety

The Naga hill samples, examined by the writer, fully support the opinion formed on examining those from Burma, -namely, that the cultiva ted races have all a loose easily breakable shell, which is also deeply fur-None have smooth polished hard shells like the wild forms which are collected in Burma and other parts of India to be used for ornamental purposes It may also be added that the average elevation of the Naga and Khasia hills may be put down at from 3 000 to 5 000 feet, whereas the smooth shelled forms are met with chiefly in the marshes of the plains of India and Burma. The white forms of the Khasia hills are harder, more polished, and less furrowed than the cultivated white forms from any other part of India, but they still preserve the characters assigned collectively to the cultivated forms. From the Khasia and Jaintia hills two samples of Core have been received both of the milky white kind. A large and a small grain from the latter resembles very much the small white grain obtained from Mergui (No 4 above) only that it is a little larger. In the report which accompanies these samples it is stated that four kinds of Coix are grown in these hills, but that "none of the four are wild, all are cultivated exclusively as an article of food The cylindr cal form" (cur stenocarpa) "is unknown to the Khasias ' The dark coloured forms are said to boil softer than the white and the smaller of the two white forms "is slightly be ter flavoured than the

larger" Food .- This curious grain might almost be said to be unknown to the natives of India generally, except as a weed of cultivation. To the hill tribes on the eastern frontier, however, it is an important article of food, with the Tankhul Nagas of Manipur 1 might, indeed, be almost described as the staple article of diet. In several districts of Burma it is also regularly grown as an article of food Mason says the esculent Coix cultivated by the Red Karens is parched like Indian corn Of the Bassein district Mr W T Hall (Director of Lond Records and Agriculture) reports that it is sown in gardens, the crop ripening in November The produce sells for K2 to R3 a bushel That officer has also forwarded to the writer numerous reports received from the Commissioners of the various Divisions, from which the following account of the method of cultivation may be here reproduced -" The mode of cultivation s as follows -ist, before the seeds are put in the ground they are tied in a piece of cloth and watered every day for about 7 to 8 days, when whitish roots appear They are then placed in the ground In some cases the roots do not appear till 10 or 15 days 2nd, at the place where the plants are to be grown furrous are formed and the seeds are laid on the earth which is first mixed with cow's dung, afterwards the seeds are covered up with a little Another method is to dig a hole where dung and decayed leaves are burnt and plant the seeds in these places This method is considered the most successful When the plants bear fruit and the latter becomes mature or grows white, the branches should be broken off cause the plants to yield another crop and thus to last much longer" Speaking of the cultivation pursued in Akyab the Deputy Commis sioner writes (of the Myohaung township) with reference to the form which he calls "the cylindrical," but which, according to the samples discussed above, is a large loo-shelled grain of the pear-shaped series -

Nava Hills.

FOOD 1602

COIX lachryma.	Job's Tears.
FORMS OF.	(2) Kalesk Kauk-nyin, the same is the last so fir as the appearance of the gruin goes (3) Kalesk as "ma" (4) Kalesk graining the Burmese series It is almost round, with in inputer gation; is pile, straw-coloured, and pronouncedly furrowed. The attended pile of the strain is pile, straw-coloured, and pronouncedly furrowed. The strength of the strain the shape aller than the shape. The half that size in thickness through the central performion. (6) Kalesk Jame, the form of stenocarpa that his been described is "femile," is short cylindreal grain with a central swelling. (7) Kalesk Kyauk is a large white or straw-coloured pers-shaped grain devoid of surface furrows. This is the largest straw-coloured grain in the Burmese collection, as No. 4 above is the smillest. Many of the steel grey whites are quite as large as No. 7, but few of the straw-coloured nors approach it in size.  In the Salwen District both the globular and the cylindrical form is cultivated, but the former exists also in a wild state. They are known in Burmese as kyeit, the cylindrical being kyeithishe, and the globular she cylindrical and Maluelettamin, the globular In Karen, Ban-kwa the cylindrical and Bosma the globular. Both forms are extensively grown in the Shan States, where the cylindrical is sold for Ri a bushel and the globular from 4 to 6 annas.  The following abstract of available information regarding Cox cultivation in Assam may be here given to complete this brief review of the subject.—
ASSAM 1691	Sir J D Hooker remarks "A great deal of Cox is cultivated in the Khásia hulls, the shell of the cultivated sort is soft and the kerrel is sweet, whereas the wild Cox is so hard that it cannot be broken by the teeth, each plant branches wo or these times from the base, and from seven to nine plants grow in each square yard of soil, the produce is small not above 30 to 40 lold." Mr McOabe, the Deputy Commissioner of the Naga Hills, reports "The Nagas of this district cultivate

e six varieties of Job's Tears The generic name is Ka si, and the varieties are as follows t - ht sh grey colour and pear shaped in with ome-

> cal in to be distinguished in fact, non-site a looper ction being

t brown un with hard to

admit of its being used for ornamental purposes
"'Sámapre'-Pear shaped in form resembling Sipia, but smaller in size. This dark brown regular grain looks at first sight remarkably I ke some of the forms of black rice. It is about the same size and is pointed at both extremities It is considerably like an elongated caraway.

""Kaddiha."—Almost globular in form, of a mottled brown and grey colour. The most marked peculiarity of this grain is that it is dark brown like the Sipin form in the lower half and yellow or straw-coloured in the upper, "'Kasi."—Globular in form of a light grey or yellow colour. This is the most common variety."  The Naga hill samples, examined by the writer, fully support the opinion formed on examining those from Burma,—namely, that the cultivated races have all a loose easily breakable shell, which is also deeply furrowed. None have smooth polished hard shells like the wild forms which are collected in Burma and other parts of India to be used for ornamental purposes. It may also be added that the average elevation of the Naga and Khasia hills may be put down at from 3,000 to 5,000 feet, whereas the smooth-shelled forms are met with chelly in the marshes of the plains of India and Burma. The white forms of the Khásia hills are harder, more polished, and less furrowed than the cultivated white forms from any other part of India, but they still preserve the chracters assigned collectively to the cultivated forms. From the Khásia and Jaintia hills two samples of Cox in who been received both of the milky white kind. A large and a small grain from the latter resembles very much the small white grain obtained from Mergui (No 4 above), only that it is a little larger. In the report which accompanies these samples it is stated that four kinds of Cox are grown in these bills, but that "none of the four are wild, all are cultivated exclusively as an article of food."	497	Products of India.
colour. The most marked peculiarity of this grain is that it is dark brown like the Sipia form in the lower half and yellow or straw-coloured in the upper.  "Kani,"—Globular 'n form of a light grey or yellow colour. This is the most common variety."  The Naga hill samples, examined by the writer, fully support the opinion formed on examining those from Burma,—namely, that the cultivated races have all a loose easily breakable shell, which is also deeply furrowed. None have smooth polished hard shells like the wild forms which are collected in Burma and other parts of India to be used for ornamental purposes. It may also be added that the average elevation of the Naga and Khasia hills may be put down at from 3,000 to 5,000 feet, whereas the smooth-shelled forms are met with chiefly in the marshes of the plains of India and Burma. The white forms of the Khásia hills are harder, more poished, and less furrowed than the cultivated white forms from any other part of India, but they still preferre the chracters assigned collectively to the cultivated forms. From the Khásia and Jaintia hills two samples of Cox in the been received both of the milky white kind. A large and a small grain from the latter resembles very much the small white grain obtained from Mergu (No 4 above), only that it is a little larger. In the report which accompanies these samples it is stated that four kinds of Cox are grown in these bills, but that "none of the four are wild, all are cultivated exclusively as an article of food. The cylindrail form "Gers. stenorapa" is unknown to the Khásia,"	COIX achryma.	Job's Tears.
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smaller of the two white forms "is slightly be ter flavoured than the larger"	Khasia Illiis,	assigned collectively to the cultivated forms from the Khāsia and Jainta hills two samples of Core time been received both of the milky white kind. A large and a small grain from the latter resembles very much the small white grain obtained from Mergui (No 4 above), only that it is a little larger. In the report which accompanies these samples it is stated that four kinds of Cox are grown in these bills, but that "mone of the four are wild, all are cultivated exclusively as an article of food The cylindrail form" (eur. stenocarpa) "is unknown to the Khāsias." The dark coloured forms are said to boil softer than the white and the smaller of the two white forms "is slightly be ter flavoured than the
	F000 1692	ratives of India generally, except as a weed of caltivation. To the hall tribes on the existent frontier, however, it is an important article of food; with the Tankhul Nagas of Manipur it might, indeed, be almost described as the explicit article of det. In several districts of Burmai it is also regularly grown as an article of food. Masion says the esculent Coix cultivated by the Red Kirens is priched like Indian coim. Of the Bassen district Mr. W. T. Hall (Director of Lind Records and Activallusiva) reports that it is so an in gradens, the crop reponing in November. The produce sells for Ret to Rejabushel. That officer has also forwarded to the writer numerous reports received from the Commissioners of the sarder numerous reports received from the Commissioners of the sarder numerous reports received from the Commissioners of the sarder numerous reports received from the Commissioners and the sarder numerous reports received ming account of the method of cultivation may be here reproduced. — The mode of cultivation is an fillow—title, before the seeds are put in the ground they are fited in a piece of clin hand wittered exert dist or along to "days, when which here's appear. They are then placed in the ground. In wire cases it received prefer furthers are formed and the seeds are laid on the careful with a first mixed with own's during afterwards the seeds are tested on the careful with a first mixed with own's during afterwards the seeds are tested on the careful with a first mixed with own's during afterwards the seeds are tested on the careful with a first are lost and plant the seeds in the engage of the committee of ground and the seeds are laid on the careful with a first are lost and plant the seeds in the engage of the committee of ground and the seeds are the committee of ground and plant the seeds are laid on the factor of the clinical and plant the seeds are laid on the factor of the clinical and plant the seeds are laid on the factor of the clinical and plant the seeds are laid on the factor of th

COIX lachryma.

lob's Tears.

FORMS OF.

"The cylindreal is sown by the wild hill tribes on Kaing land or on the slopes of hills. They do not till the land for this purpose; the seeds are thrown broad-cast, and no crie is taken of them. In times of scarcely of Good the cylindrical are caten, but now they are only used as ornaments for their dresses." The Deputy Commissioner of Kyaukpyu writes regarding a beautiful hard round form which is collected from the wild plant and used for ornamental purposes. Of the cultivated forms he says this is known as Chittee. "If grows in June and July and dies in November and December. The plant is 4 or 5 feet high and like a reed." But a smiller, more delicate, variety is also cultivated, which he remarks is eaten and also used in the manufacture of the small beer known as Khanag." He adds "The seed has to be cleaned and has the taste of maize." Of the two kinds grown he says. "The plants, however, differ widely it other respects, and I am unable to say if they belong to the same variety or not."

COMPACTER OF THE EDIDLY GRAIN—On breaking the outer shell, a cowry-shaped grain is obtained which, Professor Church says, bears on being cleaned the proportion of 1 to 4 to the total weight of the unbusked

article The Professor gives the following analysis-

# Composition of Job's Tears (Husked)

Water						13 2	2 02 49 grs
Album						18 7	2 , 434 ,
Starch		•		٠		58 3	9 ,, 143 ,,
Qil		•				5 2	0,, 364 ,,
Fibre	•		•	•		15	0,, 105 ,,
Ash	•	•	•			5 1	0,, 147 ,,

"The nutrient-ratio is here 1 3 & the nutrient value 89" From these facts it may be interred that the grain is not likely to prove of greater economic value in the future than it is at present to the poor hill tribes who are under the necessity of growing this cereal, since, in consequence of their imperfect agricultural system and poor soil, nothing else will grow even so successfully as Coix Dr Smith says "it is larger and coarser than pearl barley, but is equally good for making grue! As it is soil for five pence per Chinese pound, it makes an excellent diet-drink for hospital patients in China" It is worthy of note, however, that from the extensive series of cultivated forms which exist, and the occurrence of a long list of names for the plant and grain in nearly every vernacular language of India and Burma, an indication is given of an ancient cultivation

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doned in favour of the more wholesome grain. Even the wild plant has so large a grain as to favour the idea of its having been early adopted as a plant to be cultivated. This idea of distribution into India is partly supported by the coincidence of the vernacular names, and may also be accepted as receiving favour from the fact that in the Indo-Burman region the plant is met with largely in a wild state, and at the same time continues to be cultivated and exhibits a greater of forms than occur said to be cultia and Naga vated anywhere in Indi Hills some five or six! ... kind are ith in the wild grown, but the plant ! state, while the chindr H: but never

#### Iob's Tears.

COIX lachryma

cultivated. Unfortunitely, samples of this wild plant have not been com-

from the extensive use to which :

whom he is living. He deed words are:—"The culindrical form is only tound in the wind state and is called sized. This plant is never culivated but is found growing on the edges of terraced cultivation, and in the small gardens in the villages. The leaves recemble closely those of the cultivated species, but the plant is smaller and the stem much longher. The seed is used, in place of

the beginning of the world rats brought piddy and sikra from Japio Mountain. Man, on seeing these products, took the paddy for himself and left the sikra for the rats." Japio is the highest peak of the Naga system, where neither wild nee nor wild coix occur. The writer does not recollect hiving ever seen the cylindrical form in the Naga Hills, although he collected numerous samples of the globular; but all under such conditions as to lead him to the opinion that they were cultivated forms or at most only escapes from cultivation.

Medicine.—In some parts of India medicinal properties are assigned to the grain, as, for example, by the Santals, who aftern that "the root is

given in strangury, and the mensitual compliant known as Silka" (Rev. A. Cambbell). Dr. Dymock says the Katsai-bifa is used as a duretic.

Domestic Uses —In many localities the wild, hard, dry, spherical poses, ornathose the hard of the hard

narrow es lindical form in embroider-like designs, and the Angami Nagas construct legant earrings in which a rosette of these seeds surrounds a greenish beetle wing. The various grains which we have in the present article treated of popularly as forms of Coux or Job's letras, seem to stand a good chance of coming into use in Europe in the construction of nrtificial flowers, lees, bugle-trimmings, and other such purposes for which glass beads are now used, and possibly also in Catholic countries for the manufacture of Rosary-leads. If found capable of leing dyed a deep black colour, there might be an extensive demand for them, since they would be much more durable than glass. During the late Colonial and Indian Exhibition, several merchants, especially from France, enquired after

MEDICINE.

DOMESTIC. Neckinees. 1694

Earrings. 1605

Artificial flowers, 1606 Laces, 1607

Punterimmina 1698 500 Dictionary of the Economic COLA Job's Tears; Cola Nut. acuminata. DOMESTIC. identified as Polytoca Wallichiana, but have since been determined as C' farpibud ann dianversal C 1 " " " " most suitable for the European market. Along with these the cylindrical form would afford the manufacturer of laces, &c., a choice of two forms which might be elegantly combined. PRICE. PRICE OF COIX GRAIN.-This has been variously estimated at from 1700 8 annas to R4 a basker, but it seems probable that were a regular demand to arise, a fixed rate would soon be established, which would probably rule considerably below that of rice. It would have, however, to be discovered whether the hard forms could be cultivated without losing their characters which recommend them as decorative articles. The writer has offered the suggestion that some of these may be the produce of a distinct species from that of the true Job's tears (Coix lachryma), and if so it might be found possible (as with the cylindrical) to cultivate them nuthout softening the series Coke, see Coal.

COLA, Scholl.; Gen. Pl., 1., 218.

1701

Cola acuminata, R. Br.; STERCULIACEE.

1881, p. 10; Christy, New Com-Botany, p. 311; Smith, Dict. India; U. S. Disp., 15th Ed.,

This large West Tropica. African tree has been experimentally intro-

ly
ia
in
with cocoa. The leparation of

ainst fatigue is such that it is itary authorities of the world as

an article to be given to soldiers during active service.

The bean has been analysed by Messrs. Heckel and Schlagdenhauffen, by Dr. Attfield, and others.

There are many tracts of country in India that seem likely to prove suitable to Cola cultivation, and doubtless this subject will in the future receive a greater degree of attention than it has as yet obtained from the Indian planters.

Officinal Colchicum

COLCHICUM autumnale.

1702

1703

### COLCHICUM, Linn., Gen. Pl. III, 821.

Colchicum autumnale, Linn., LILIACEE

OFFICINAL COLCHICUM: MEADOW SAFFRON OF AUTUMN CROCUS.

References — Pharm Ind., 243, Fluck & Hash. Pharmacog., 609; U. S. Duhens, 15th Ed., 450, 470; Bentley & Tenn., Med. Pl., 228, Demack, Mat. Met. W. Ind., 825, Annise, Mat. Ind. Profest., 221, O. Shaughnessy, Beng. Dupens, 658, 1 ear Book of Pharmacy, 1514, \$2. (30), Knjle, Ili. Him. Bat., 1, 325, Spar, Encistop., 408, Balfour, Cyclop., Smith, Dir., 123; I reasury of Book potany, Norton, Cyclop. Agrs.,

Habitat.—The plant grows in the meadons throughout Europe

rue resu comisana me secus or Cocine a are officinal.

C. sp.

Vern - Siringán, lolkh, shirin, PB , Loabale Larbari, sáringan, HIND , BONB , BEYG , TAM , and ARAB , Aaknak, PERS

Mr. Baden Pówell gwes this the name of C. illyricum, The HERMODACTY or "FINGER OF HERMES" Dr. Moodeen Sheriff says there are two kinds of the drug-Sternyane-shifin (neet Sternyan) and Stern yane-talkh (hitter Sternyan) Dyrrock speaks of these as the tasteless variety and the batter, but adds a third form or rather substitute which he says is the sliced buils of Narcissas tracetis, which are imported from Persa and sold as a batter Sternyan The learned authors of the Pharmacographia (and also Dr. Oooke) are of opmonthat the butter inexisioners it is not the produce of a Colincium at all, while Professor Planchoun, and following him see all other authors, attribute the drug to Colincium variegatism. Limi, a native of the Levant and not known to be found in Kashmir or Persa. Planchon in his account of Sternyan gives a figure of C. vangergum, Linn, in the Bet Mag. 1 1021

References -Royle, Ill Him Bot, 385, Baden Powell, Pb Pr, 381

Yournal, April 1871

Habitat.—The plant from which this medicinal product is obtained is

Irug:
Greeks, it appears to have been first used medicinally by the Arabs or liter
Greek physicians; it was first mentioned by Alexander of Trailes, who
flourished A D 560 (Libr. A.I.) It is descring of special notice that
under the name of Surugen or Hermodacty, Berapion comprehends the

11570RY.

# COLDENIA

#### The Surinjan, Trailing Coldenia,

#### HISTORY.

Wir Muhammad Husain tells us in his Makhsan that the white is the best, and that it is not bitter, next the yellow, both may be used internally, the

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applied to rheumatic and other swellings, the powdered root is sprinkled on wounds to promote cicatrization Two kinds of Surinjan are met with in Indian shops, bitter and sweet European phys cians in India who increase in the control of the contr

MEDICINE 1705

grains, used i heart disease constipation Lall, 1st clas

Jubbulpore) the latter is officinal and useful in rheumatic affections" (T N Glose,

Assistant Surgeon, Meerut)

Colchicem Inteum, Baker, according to Aitchison, in a note furnished to the writer, "occurs in early Spring in the Panjab from Campbellpore, across to Abbottabad the Gullies, at Murree, and in Kashmir extending to Zoia pass

Probably it is the root of this that is Haran tutiya But the root of Merendera Persica, Bois (Syn Aitchisonii, Hooker) may be mixed

with

With it

SUBSTITUTE OF SUBINIEN—Dr. Dymock says that the sliced bulbs
of the true Narcissus (N tazetta) which are imported into India from
of the true Narcissus (N tazetta) which are imported into India from
of the true Narcissus (N tazetta) which are imported into India
structure

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doses 2 to 8

## COLDENIA, Linn, Gen Pl, II, 841

1707

SUBSTITUTES

1706

Coldenia procumbens, Linn, Fl Br Ind, IV, 144, BORAGINEE
TRAILING COLDENIA

Vern — Tripungkhi tripunkhi, tripungki, Hino ; Bursha, Sino ; Tri pakshi, Bona Seru padi siru-padi Tam , Hamsa padu, hama-padi, Tel., Tripakshi, Sans Serappadi, Tam in Cevlov

121. , **Ippasyn; Gans Scrappan; Asai Inches.

References — Roob, F. Ind., Ed. C. B. C., 150, Volyt, Hort Sub Cal., References — Roob, F. Ind., Ed. C. B. C., 150, Volyt, Hort Sub Cal., Alchieno Cat. Ph. I. F. G., Amiric, Mart and Drug Dymock Mat. Archieno Cat. Ph. I. F. G., Amiric, Mart and Cat., Sp. S. K. Pener Bat and Cat., Sp. Marray of Harry St. Marray of The Progr. Sind, 170, Dury, U. P., 153, Balfour, Cyclop, Treasury of Botan;

Habitat.—A small annual weed, usually quite flat common throughtropical India, it generally grows on dry rice fields during the cold season, disappearing about the beginning of the periodical rains it is common in the hot dry parts of Ceylon Distributed to Assa, Africa, Australia, and America

Colebrookia; Country Borage.

COLEUS aromaticus.

Medicine.—As a medicine, equal parts of the dry PLANT and fenugreek seens subbed to a fine powder, and applied warm to boils quickly brings them to suppuration (Ainstie) The fresh leaves, ground up, are applied to rheumatic swellings (Ainrray) MEDICINE. Plants 1708

COLEBROOKIA, Sm ; Gen Pl. II, 1180

A Himálayan genus, comprising only one species, and that one of the commonest and most abundant plants in the Lower Himálaya and mountains of India ascending to 4,000 feet in altitude Leaves 1700

Colebrookia oppositifolia, Sm , Fl Br Ind , IV , 642; LABIATE

Vern -- Pansra, Hind, Shakardana, phisbekkar, dus, sampru, sédli,

1709 1710 1711

Reter to the contractor

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MEDICINE.

Mysore It is now viewed as not even worthy of separate recognition as a variety.

Medicine.—The leaves are applied to wounds and bruses (Stewart)

"The down is used by the Paharias to extract worms from bad sores on the legs (Gamble). A preparation from the root is used by the Santáls in enter it (Fig. 1).

1712 FODDER 1713 TIMBER

1714

1715

gra •

COLESEED or COLLARD, see Brassica campestris, Linn, var

COLEUS. Lour . Gen Pl . II . 1176

Coleus aromaticus, Benth, Fl. Br Ind, IV, 625, LABIATE
COUNTRY BORAGE

Syr -C Amboinicus, Lour Voigt, Hort Sub Cal, 450; PLECTRAN-THUS AROMATICUS, Koxb , FI Ind , Ed C B C , 466

Vern — Pathor chur, Hind Pdite chur, Beng Pathor chur, pathur chur, oma, Bome Pathor chir, Mar Pathana bhedi, Sans la Flora Andârica, karpura-adili sa applied to this plant, but Dr. Moodeen Sheriff is of opmon, that the name is more in use for Anisochulus carpogus, than any other name

References —Dals & Gibs, Bomb Fl Suff, 66, Pharm Ind, 168, Moodern Shriff, Suff Pharm Ind, 114 51, U C Dutt, Mat Med Hind, 313, Dymock, Mat Med Hind, 313, Dymock, Mat Med Wind, 505 Drury, U Pl, 153, Litbon, U Pl Bomb, 168, Royle, Ill Him Bet, 1, 303, Balfour, Cyclop

COLDENIA procumbens.

#### The Surinjan; Trailing Coldenia,

HISTORY.

Mir Muhammad Husain tells us in his Makhran that the white is the best, and that it is not bitter, next the yellow, both may be used internally; the

in Indian shops, bitter and sweet. European physicians in India who

medicine, 1705

grains, used i heart disease constitution,

Call, ist class Hospital Assistant, in charge of city pranin inspensity, Jubbulpore) "Two varieties are found in the bazar—sweet and bitter; the latter is officinal and useful in rheumatic affections" [T. N. Ghose, tassistant-Surgeon, Alternit]

Colchicam luteum, Baker, according to Artchison, in a note furnished to the writer, "occurs in early Spring in the Panjab from Campbellpore, across to Abbottabad, the Gullies, at Murcee, and in Kashmir extending to Zona 2022.

Probably it is the root of this that is Haran-fullya But the root of Merendera Persica, Bois (Syn. Aitchisonii, Houker) may be mixed

Substitutes. 1706 Substitute of Schinia —Dr. Dymock says that the sheed bulbs of the true Narcissus [N. tazetta) which are imported into India from Persa as a substitute for Surnijan are easily recognisable. He remarks this drug "may be at once detected by its larger size and tunicated structure. The taste is bitter and acrid, the substance amylaceous and very similar to that of the Hermodacty! It is used as an external application, and, according to the author of the Makhsan, has properties very similar to those of surnifan-i-talkh. Value, annas 3 per th

COLDENIA, Linn.; Gen Pl., II., 841.

1707

Coldenia procumbens, Linn.; Fl. Br. Ind , IV., 144; BORAGINEZ.
TRAILING COLDENIA.

Vein.—Tribungkh, tribunkhi, tribungki, Hind ; Bursha, Sind ; Tripakihi, Bons , Seru-padi, mru-padi, Tan , Hamsa padu, hama-padi, Teu., Tripakhi, Sans., Serappadi, Tan in Certon.

Tet., Irigaithi, Sans., Strappadi, Tam in Letton.
References.—Rock, F. Ii nd., Ed. CB C., 150; Vorel, Hort. Sub. Cd.,
References.—Rock, F. Ind., Ed. CB C., 150; Vorel, Hort. Sub. Cd.,
145., Thwaites, Fn. Ceplor Pl., 215; Dain, G. Ghbs., Bonhall, 117,
Althoun, Cat P. Pl. (2); Annite, Mat. Ind., I. 145.) Sharra,
146. If W. Ind., 2nd Ed., 356; S. Myun, Bonb. Dugt. D. Marra,
146. Sub. Sub. J. (2); S. Myun, Bonb. Dugt. D. Marra,
147. Sub. Sub. J. (2); S. Sanjour, Sping ; Treasury of
Batames.

Habitat.—A small annual weed, usually quite flat, common throughout tropical India, it generally grows on dry rice-fields during the cold out tropical stappearing about the beginning of the periodical rains. It is common in the hot dry parts of Ceylon. Distributed to Asia, Africa, Australia, and America.

#### Colebrookia . Country Borage

aromaticus

MEDICINE Plants Medicine -As a medicine, equal parts of the dry PLANT and fenudapplied warm to boils quickly The fresh leaves, ground up, are

1708

COLEBROOKIA, Sm . Gen Pl . II . 1180

A H malayan genus comprising only one species and that one of the com-monest and most abundant plants in the Lower H malaya and mountains of India ascending to 4 000 feet in altitude

Leaves 1700 1710 I7II

Colebrookia oppositifolia, Sm., Fl Br Ind., IV. 642, LABIATE c 1 - 2 AT 1 (1 - 3.

appled to Adhatoda Vasica

References -Roxb Fl Ind , Ed CBC 467 Voigt Hort Sub Cal ,

Habitat - A shrub with prev bark common on the other H mala.

It is now viewed as not even worths of separate recognition as MEDICINE.

a variety Medicine.-The leaves are applied to wounds and bruises (Stewart)

"The down is used by the Paharias to extract worms from bad sores on the legs (Gamble) A preparation from the root is used by the Santals

1712 FODDER 1713

1714

1715

gra

Mysore

COLESEED or COLLARD, see Brassica campestris, Linna var Napus, B No 810

COLEUS, Lour , Gen Pl , II , 1176

Coleus aromaticus, Benth , Fl Br Ind , 11' , 625 , LABIATE

COLNERY BORAGE

Syn -C Amboinicis Lour il ogt Hort Sub Cal, 450; Plectran this aronaticis hord, Fl Ind. Ed C B C. 45 Vern.—Pathor chur Hind Patier chur Beng; Pi her chur pathio chir, ona, Bonne; Pathor chir, Man; I fishing thed, Sans in Fora Andhrica herporned in applied to the plant, but Dr Moodeen Sheriff in clop mon, that the name is more in the for

Anisochilus carnosus, than any other name

References.—Das & Gils, Bont Fl Supp. & Farm Ind., 119, Roden Shent Supp Pharm Ind., 114 51, L C. Dut., Mat Med Ind., 512, Dynack Ret Hed Wild 525 Druty, U Pl. 1513, Lilian L Fl Ermt, 115, Key., L Him Ex., La Y.1, Balpar, Cycly

#### COLLOCALIA.

#### Country Borage; Birds' Nests.

MEDICINE.
Plant
1716

Habitat .- A native of the Moluccas, cultivated in gardens throughout India; has a pleasant aromatic odour and pungent taste Medicine. The PLANT "is employed in Cochin China, according to

, and as a a the treatment of which the expressed juice is prescribed mixed with sugar or other suitable vehicle. In his own practice he observed it produce 50 decidedly an intoxicating effect that the patient, a European lady, who though

ng properties, and states that the people of Bengal employ it in colic and dyspensia" (Phar) dyspepsia" (Phari never heard of this the Phormacopæia of Ir ın a much larger quantity than is usual in Bombay. Special Opinions -6 " Fxr

Julce 1717

an anodyne and astringent, cases of conjunctivities (An Noakhally). "Said by Sans bladder and to be useful in (U.

pep

orms an agreeon. . Roxburgh says that "the leaves, and indeed all parts of the plant, are delightfully fragrant; they are frequently eaten with bread and butter, also bruised and put into country beer, cool tankards, &c., being an excellent substi-

tute for Borage"

1710

FOOD.

Plant. 1718

> Coleus barbatus, Benth., Fl Br. Ind , IV., 625; Wight , Ic , t. 1432 Vern .- Garmal, BOMB

References. -- Vongt, Hort. Sub Cal, 449; Thwaites, En. Ceplon Pl, 238, Dale & Gibs, Bomb Fl, 205, O Shaughnessy, Beng Dispens., 401, Drury, U. Pl, 154, Luthoa, U. Pl. Bomb, 168, Royle, Ill. Him. Bot, I, 101, 103, Balfour, Cyclop

Habitat .- A native of the Peninsula, Gujrát, Behar, and of the subtropical Himalaya, from Kumaon and Nepal, ascending to 8,000 feet. , whence it was introit grows luxuriantly

FOOD. 1721

ardens of the natives at Bombay for the roots, which are pickieu (J. Graham)." (Drury). Lisboa says that the pickled root is much used by the Gujarátis.

ız∠ı

#### COLLOCALIA.

It would appear that there are two or three species of Swiftlet which form edible cests Dr. Jerdon is of opinion that the best nests are obtained from Java Several other species occur Java Several other species occu-ero Archipelago, as far as New he writ its unable to discover the n beginne the part a feel by which a consisting coming to the MET had Beta There difica.

1722

Collocalia nidifica, Gra, Circinis

C. linthi, Herr'e's.

The Peter Print See, Surveyer, Feg., Siev of Texcis. In Department recognition. Gam., Mustiler have It. Surveyer Charles, Mr.

Survey makes 12 72 Nes we have a state of property & Safistan

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An angera Nigel St. 10.

References with easy flat on lind Surger (let 1) 11. It said to write the flat on a get limit to a V. 12. Fe extra life 14m artists on the flat on the flat of th

Habitat—Teel rife which construct the of the construction of the figure of Mandel North Information, and a fine hard North Rock on the Garce Malsaniftating to Deficel, at Tax is and North Rock on the Garce Malsaniftating to Deficel, at Tax is and Mergus, and in the Andardin and the Gold of the Garce of the Malaber and it decided on the Garce of the Malaber and the Concast count the Bay of Bengalted to Burners of Garce, and the Malaber Rock of Garce would the Free on the Garce of the Malaber of the Garce of

Aspens Selison - Mr Portman, a ha rep it the Ardaman Is 'red t dib cli de Acere are -" I have of recept two kinds of anathone, ledber which build in the error. The larger tod has in we white in his Humage, and bu'ds a nest of twice and grass, &s , gland together, and attached to the rick to a preuliar much ginous matter. The smaller find fineds a nest of white muciligations matter entirely, and it is this nest witch is at much sought after. He nest abult in the firm of a small to eker area ledge she site at part of the case of a sequence day from with a radius of about of netes and regarding the matter of which it scenprediptin differ The cases it present known are Pristice Island where is small quant is of the best nests are procurable, but which is call approachable in the cilmest weither. North Cinque Island, to which the same remarks apply. Chiran Papu, one case. North Coast of Rutland Island opposite Varatan, one case. Jolly-Boy Island, north side, one case Montgomery Island in Port Campbell, one case on west side. Neill Island, one cave on north-east coast, very difficult of approach John Lawrence Island, cast coast, opposite East Island. The case is hidden by a mangrove swamp. Strait Island, South Point, one cave. South flutton Island, several caves, vielding the best quality of nests. About three miles inland at the north end of Stewart's Sound. large cives are to be found in a hill, from which the greatest quantity of our nests are obtained " "In florned, from which country China obtains the majority of her birds' nests, the better qualities of nests are found in caves in the interior in crystalline limestone rock, only an interior quality of nests being found on the seashore. These remarks apply equally to the Andamans, and I have no doubt that when the interior of the islands

ANDAMAN ISLANDS, 1723

#### COLLOCALIA nidifica.

#### Edible Birds' Nests.

NICOBAR ISLANDS. 1724

RURMA.

1725

is explored, many more nest-yielding saves will be found. All our present knowledge is derived from the Malays, who, through fear of the Andamanese, did not date to search the interior. The explorations should be confined to hilly country, where the crystalline limestone formation predominates."

NICOBER ISLANDS.—Mr. deflæpstorff, in his official report of the Nicobar Edible Birds' Nests, remarks: "The best nests I found at Katchall. They were entirely snow-white, and of the best quality. The next best quality I have got were from the Island of Bomboka. This island I have got were from the Island of Bomboka. This island I he same snow-white besutiful ests from Katchall are round and ests from Katchall are round and

orange."

"The third quality I have is from Sambelong. This is white enough, but intermixed with little weeds or granual stalks. These nests are of good quality.

The control of the cont

I got from it storff's bluff worthless for proceedings of the worthless for proceeding the same glutinous matter which forms the fastened together by exactly the same glutinous matter which forms the

nests first mentioned."
"The Island of Katchall is mostly formed of coral, limestone, and sandstone in all different stages, old, flinty, and yet forming. The island has

The light of the sun never shines there. The ground is son to head on

side of the second second the second 
In species occurs abundantly on parts of the coast of the Malayan Peninsula, in the Nicobar Islands, and the Mergui Archipelago, and so high as on

from all this
a, nor does it

appear that any other has been observed; and I have examined a multitude both of the adults and of the young taken from the nests, collected in the same species, ins far in the asts; and it is

ve been hitherto

"It may be here added that C. Inciphaga is constantly seen inland in these provinces. The Karens in the valley of the Tenasserm in the latitude of Tavoy are well acquainted with the bird, and they say it crosses the mountains to and from the interior every year. That it is the same species there can be no doubt, for the Karen name of the bird is 'the white swallow,' from its white belly."

#### Edible Birds' Nests.

COLLOCALIA nidifica.

In the Burma Gazetteer a list of the birds found in the province is given,

and among these are included three species of Collocatia, vir, C. Innominata, Hinne, C. spodiopying, Peale, and C. linchi, Horff MALARIA Coast—Very little of a definite nature can be learned regarding the edible swallows' nests collected on the western coast.

MALABAR COAST.

COLLECTION. 1727

sea-weed which the bird macerates and bruises before it employs the material in layers

so much prized a other hand, many gelatinous materi brought up from

food of the swift, vis , insects In support of this opinion they point out that the better qualities of the nests are found in caves far removed from the sea. Some of the nesting caves of Borneo are 140 miles from the sea Mr. deRoepstorff points out that there are no edible nests in the Nicobar settlement, but a few miles off in a richer tract of country where insect life abounds they are plentiful "It is thus," he says, "in places where the food of the swillow is plentiful, that they exist under the most favourable circumstances, and where the nests are best" In the Ratnágiri District Gazetteer it is stated "the swiftlets breed in March and April,

nade of inspissated saliva, in the fresh, but when old, brownish

Iceland moss. I have often seen this sea-weed, but have never seen the birds on the sea-shore gathering it Another theory is that the bird excretes this matter from his own throat during the breeding season" "I am ur have a th

Mr P pursued 1

their nests, all the caves should be visited and the nests collected and brought in. The date of the co and adead the a mher of collect one during the sea

rain ceases

5th January As the collection takes about a month and the

so, the collectors should wait about 10 days in Port Blair, and then go out again, taking care to observe exactly the same order in their rounds. The nests may be col-

COLLOCALIA nidifica.

Edible Birds' Nests

NICOBAR ISLANDS 1724

is explored, many more nest-yielding taves will be found. All our present knowledge is derived from the Malays, who, through fear of the Andamanese, did not dare to search the interior. The explorations should be confined to hilly country, where the crystalline limestone formation predominates,"

NICOBAR ISLANDS -- Mr deReepstorff, in his official report of the Nicobar Edible Birds' Nests, remarks "The best nests I found at Kat chall They were entirely snow-white, and of the best quality best quality I have got were from the Island of Bomboka This island I have not personally visited," but he adds, the nests from it "are quite free from foreign mutter, and have not the same snow white beautiful colour as the ones from Katchall. The nests from Katchall are round and egg-formed, while those from Bomboka are long, like the section of an orange"

"The third quality I have is from Sambelong This is white enough, but intermixed with little weeds or granual stalks These nests are of good quality, but need cleaning to separate the stalks. The fourth quality I got from the Car Nicobar from a cave in Dryad's Bay in de Roep-storff's bluff in the north end of this island. These nests were entirely worthless for purposes of trade, consisting of the little weeds which are mentioned in the nests from Sambelong. These nests are, however, fastened together by exactly the same glutinous matter which forms the

nests first mentioned'

"The Island of Katchall is mostly formed of coral limestone, and sandstone in all different stages, old, flinty, and yet forming The island has gone through a series of volcanic revolutions and convulsions, and presents a very pretty landscape, many rents and tearings, ravines and caves extending far under the earth. In these caves dwell the bats and the little swallows The light of the sun never shines there The ground is soft to tread on If you lift it up and inspect it under the torch light it is seen to contain the wings of the insects, that have fallen a prey to the bats, glimmering like a thousand little rubies, the soil is moist, spread it a little and you see the little long-shaped excrements of the swallows together with the feathers fallen from the roosting birds. This is the guano. The swallows nests are not easily seen but if you lift the torch up to the arched roof by the side of the alabaster-like transparent stalacutes white like these, the black

head of the little mother appears out of her white little nest"

IN BURYA - Mason says of C fuciphaga (C linchi) ' This particular species occurs abundantly on parts of the coast of the Malayan Peninsula, in the Nicobar Islands and the Mergui Archipelago, and so high as on certain rocky islets off the southern portion of the coast of Aracan, where the nests are annually gathered, and exported to China From all this range of coast we have seen no other species than inciphaga, nor does it appear that any other has been observed, and I have examined a multi tude both of the adults and of the young taken from the nests collected in the Nicobars and preserved in spirit, all of which were of the same species Still, what appears to be C midifica inhabits the mountains far in the interior of India, though hitherto unobserved upon the coasts, and it is worthy of notice that C Inciphaga does not appear to have been hitherto remarked inland in this country (Staunton quoted by Mason)

"It may be here added that C inciphaga is constantly seen inland in

these provinces The Karens in the valley of the Tenasserim in the latitude of Tavoy are well acquainted with the bird, and they say it crosses the mountains to and from the interior every year. That it is the same species there can be no doubt, for the Karen name of the bira

is ' the white swallow,' from its white belly "

RURMA 1725

#### Edible Birds' Nests.

COLLOCALIA nidifica,

In the Burma Gazetteer a list of the birds found in the province is given, and among these are included three species of Collocalia, viz, C. inno-

minata, Hume, C. spodiopygia, Peale, and C linchl, Horsf

MALADAR COAST.—Very little of a definite nature can be learned regarding the chible swallows nests collected on the western coast. They are said to be found in Rainfgiri, North Kánara, and even in Mysore. According to the Graetteer of the Rainfgiri District the species found on the Vingorla Rock is C unicolor, Ferion, No. 103 "The rock on which the nests are found is about four miles long."

PECULIARITIES OF THE NETS AND THE MODE OF COLLECTIVES THE FRETE SHEETENCHE OF PRINCE THE PRINCE OF THE METERS OF THE METERS USED TO COLLECTIVE OF THE METERS USED TO SEE METERS USED TO S

COLLECTION.

1726

Nicobar settlement, but a few miles off in a richer tract of country where insect life abounds they are plentiful "It is thus," he says, "in places where the food of the swallow is plentiful, that they exist under the most

Mr Portman remarks: "The shanow is supposed by some to make this matter, which resembles isinglass, from a species of sea-weed (fuens) resembling Carrigeen, an Iceland moss I have often seen this sea-weed, but have never seen the birds on the sea-shore gathering it. Another theory is that the bird excretes this matter from his own throat during the breeding serison." I am unable to give any decided opinion in the matter, but the natives

their nests, all the caves should be visited and the nests collected and brought in. The date of this visit, and, indeed, the number of collections during the season, are fixed by the time at which the north-east monsoon rain ceases. Being unusually late this year (1885-86), we did not commence nest-collecting till the end of February, but with a dry December the collection might commence on the 15th January. As the collection of nests from the present known caves takes about a month and the swallows rebuild their nest in six weeks or so, the collectors should wait about 10 days in Port Blair, and then go out again, taking care to observe exactly the same order in their rounds. The nests may be collections should wait about to days in Port Blair, and then go out again, taking care to

COLLOCALIA pidifica.

### Edible Birds' Nests.

### COLLECTION

lected until the commencement of the runs, when the collection should crise, and the birds be left to breed. Although the great demand is for the white nests, still it may be remirked that the fucus attachments of the grass nests, and the old nests gathered in the November cleaning, may be sold locally at R5 per seer, and should, therefore, be collected. Lach collection averages about 5-lb of nests." He then proceeds to state the number of men employed by

"The six collectors are supplie

dahs, also with a large clean bag

an iron implement, about a foot long, with three prongs at one end, and the other end being shaped like a cold chief. These men dirach, with roofs of the caves, placing them the end of the vork, they are

"The greatest error is necessary in detroching the nests from the cases, that they should not be broken or soiled. After being brought into the settlement, they are cleaned and procked in circular bundles about a four in drameter, and four inches thick, ready for export. The refuse from the Cleanings should be aveil and soil.

hests. 1728 COOKING THE NESTS—"They are first sorked in cold water for two house, when they saelf up and become soft. They are then easily picked to pices and cleaned. After this they are boled in clear chicken-brith until dissolved, a process occupying about two hours longer. The usual allowance is one nest is also left; to a texcupial of soup. Any clear is up may be used. The nest is also lately tracters and flavouries, and flavouries, and flavouries, and flavouries.

TRADE.

n . Loud that it is particularly strengthen ng or useful in any way."

Rung in Lingur Nexts —Particulars are not available regarding
the four extent of the tride in Indian nests. The merchants are Climation
Whyter de in Rangon. They recognise three classes i—

* No. 1, larke, pure, white nests, averaging from Rito-115 per visses 31" i

No 2, clean, his sightly constend nests averaging from kino-140

No un ted is nited and de er nests averaging. The refuse se is a frim \$4-15 a seer."

A lits resecting a merical analysing stedens Control lits resective for 1,25 of the first 1, the metite of the first 1,25 of the first 1, the metite of the first 1,25 of the

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1731 1731

the way to the phone of the following the following the first of the f

#### Kaché or Taro.

COLOCASIA antiquorum

not at least meet all its own demands for minno manure if not open up an export trade in the article.

Collodion, see under Gossynum.

## COLOCASIA, Schott,: Gen. Pl. 111., 074

1731

DeCandolle states that the Colocasia of the ancient Greeks was most probably the sacred lotus, but that the name become transferred to the and and and made-He also suggests hu, and been inmade known to

he word may be

accepted as carrying with it the greatest degree of probability

the Bombay name terem be admissible as coming from the same root?

Wight, Ic . 1 786 : AROIDER

Colocasia antiquorum. Schott ; DC . Mono Phancrog , II , 491 ; TARO. EDDOES. SCRATCH-COCO, EGYPTIAN ARUM, COCO, KOPFH

1732

Sometimes but incorrectly called YAM Syn -ARUM COLOCASIA, Willd ; Rozb , Fl Ind , Ed C B C , 624 Vefn - hachu, gori kachu, ashu kachu, arvi ghaja ghuja

Him La Ly L

habarala the young cultivated tubers being known as kan latta, or to tala Sing, Imo, Japanese

20%

Habitat -Wild over the greater part of trop cal India, and also cultianted throughout India on account of its corms, which are used as an important article of det when boiled. Stewartsays: "It is grown at places in the hills to a considerable elevation, I have seen it at nearly 7/20 feet in Chumba and Kullu" DeCandolle, in h , Origin of Cultivated I 'antiwrites "Since the different forms of the species lave been properly classed, and since we have possessed more certain information along the

COLOCASIA antiquorum.

# The Kachú or Taro.

floras of the South of Asia, we cannot doubt that this plant is wild India, as Roxburgh formerly, and Wight and others have more recent asserted, likewise in Ceylon, Sumatra, and several islands of the Makarchipelago."
Engler (in DC., Hono, Phanerogm, vol II) describes some seven van ties of this plant, three of a typica; Wight, Ic., II. India. — II. India. — II. India. — II. India. E. C. B.C., 624. Chamakura Tel.
kacha, the corms of
the ashú kachú, whi
1
f. I, cultivated form
ζ, nymphæifolia (Arum nymphælfolium, Roxb, Fl. Ind., Ed. C.B.C 624, Wight, Ic. † 286. Plasda, Val., VI.
Bengal a Madras;
aquatic s
on the borders of lakes and tanks "The root, or rather the subterraneous stem, often grows to the length and thickness of a man's arm. The petioles, scape, and leaves, are of a reddish colour, and the plants considerably
larger than any of the varieties of Colocasia" (var typica above), "yet the leaves are narrow in proportion to their breadth" The only good charac-
ter by which to know this form "is the shortness of the club of the spadix"
"Every part of this plant is eaten by the Hindus"  A good deal has been written regarding the cultivated species of Colo-
casia, but it has been found impossible to discover what species, still less
which varieties, are alluded to On this account it has been deemed desirable to compile the economic information here given from such authors as
could be depended on for the accuracy of their general information,
and to thus leave for future research a more detailed description than will be found here.
The following facts seem to refer to var typica.  Medicine.—The pressed juice of the petioles is styptic, and may be
used to arrest arterial homorrhage. Dr. Bholanath Bose reports very
highly in favour of this property, and states that the wound heals by first intention after its application (Pharm. Ind) It is sometimes used in
emache and otorrhoea, and also as an external stimulant and rubefacient
Special Opinions.—§"The juice expressed from the leaf stalks of the
black species is used with salt as an absorbent in cases of inflamed glands and bubbes. The juice of the corm of this species is used in cases of alo
necia Internally, it acts as a laxative, and is used in cases of piles and
congestion wasps and other e seen
remarkab o fresh
and clear ithin a few hours
Tree The short 1 1 1 allong harmon book of
where as a weed of damp places The wild condition of the plant is by
the Angami Nagas called Kirth "The young leaves may be eaten like

F00D. 1734

MEDICINE.

#### The Bish Kachú

COLOCASIA virosa.

spinach, but, like the root, they require to be well cooked in order to destroy the acridity peculiar to Aroids A considerable number of

FOOD

"The tuber of the cultivated variety is long, white, carrot-shaped, often weighing several pounds, and forms an important article of food among the lower classes, where quantity and not quality is It is usually served fried in ghi or boiled and pounded a desideratum into a paste, and also in curries

hardly weighing more than a q Combatore it is stated that the often weigh as much as 70 to 80"

maunds (of 25th), worth 12 annis a maund. The tubers are used by the natives of Bombay in curries, &c They form the common food of the inhabitants of Travancore The Malays hold it in high estimation (Balfour)

"Is considered very nutritious by the natives, who use it in their curries" (Honorary Surgeon P Kinsley, Chicacole, Madras)

Colocasia cucullata, Schott

Syn for Alocasia cucullata, Schott

C. indica, Engl , DC , Vono Phanerog , II , 494.

Syn for ALUCASIA INDICA, Schott, which see, A 809

This plant is said to be specially cultivated in Brazil for its esculent stems and small pendulous tubers. It is known as Man saru in Orissa, and is there used in the treatment of piles

C. macrorrhiza, Schott

Syn. for Alocasia Macrorriliza, Schott

A species met with in Eastern Bengal and Sylhet, also in Ceylon (the habarella) Often cultivated, and the leaves of the very young plant also eaten (Thwastes, En Ceyl Pl., 336) It has been found impossible to obtain definite information as to the extent this plant is cultivated in India. and also as to whether or not it can be viewed as indigenous DeCandolle, in his Origin of Cultivated Plants, refers to it as wild in Otahiti and in It is known in the former as apé and in the Friendly Islands as kappe Ainslie (Mat Ind , 11 , 463) gives its Chinese name as dea vew and the verrughung kalung in Tamil, and the Hastid carnid (?) in Sanskrit He remarks "This root in its raw state, like most of the arums,

by the application of heat or by simple drying, the roots become innocuous

C. virosa, Kunth , DC Mono Phanerog , II , 495 ; Roxb , Fl Ind , Ed C B C, 632 (under calla)

Vern -Bish Kachu

This plant, which is a native of the Lower Provinces, is the only member of the genus which the natives of India regard as poisonous sometimes used medicinally, but is never eaten

C. 1738

1735

1736

1737

17.38

COLOCASIA virosa.

### Poisonous Properties of Aroids

CHEMISTRY 1739

Chemistry -Through the kindness of Messrs Pedler and Warden (Professors of Chemistry in the Calcutt i University), the writer has had the pleasure to receive an advance copy of their paper* on the chemical properties and medicinal uses of the species which by the early botanists, were all treated as belonging to ARUM, b . Lal L been thrown into some half a dozen gen

paper was to investigate the Toxic Pri

and the enquiry was suggested on receiving from the Civil Surgeon of Dibrugarh' some portions of raw Bish Kachu tubers and leaves with the following statement 'A cooly woman administered some of the fried kachu to another sick cooly on the same garden, but the man, experiencing a burning sensation in his mouth, instantly spat it out A pig ate what was so thrown away and died in an hoir A second pig was experimented on with some of the same stuff, and fatal results also supervened' During the course of the same year a second case of poisoning by kachu was referred to the Chemical Examiner's Department, in this case slices of kachu tubers were introduced into a jar containing 'goor' symptoms induce. - the person into the ised.

as the symptoms

A sample of

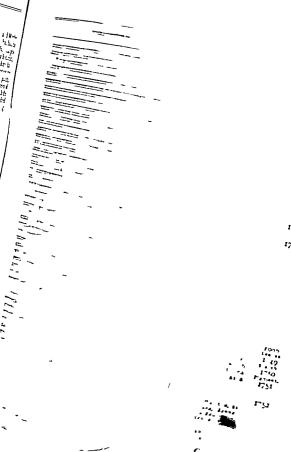
brugarh were forwarded to Dr King for identification but as a flower had not been furnished he was unable to name the plant further than that it was a species of Alocasia or Colocasia Roxburgh and all subsequent writers on economic botany say that the bish kachu is Colocasia virosa and accepting this to have been, in all probability, the plant Pedler and Warden experimented with, their results may be here briefly summarised -In peeling the tubers "considerable irritation was experienced about the hands, but there was a complete absence of any irritative action on the olfactory organs or conjunctivae. This fact appeared to us to point towards the non-volatile nature of the active principle' holic extract was prepared and found to have no poisonous effect same result followed on the administration of a distillate which was found to have no acrid taste and as with many other vegetable substances dis tilled with water, it was found to contain a trace of hydrocyanic acid "It is possible, however, that certain varieties of Arum may contain a larger amount of prussic acid, as, for example, the A seguinum of the West Indies, which is stated to furnish a juice, two drachms of which has proved fatal in a few hours The tubers left in the retort after distillation with water were sti

ciple was not dis-

ARUM for culinary

and ascertained that boiling with water acidulated with hydrochloric acid for a very short period, rendered the tubers quite mert when a fragment was applied to the tongue Dilute nitric acid also acted in a similar manner The action of acetic acid on the other hand, was very much feebler, and the acid had to be stronger in order to produce any decided diminution in activity " " A rough analysis of the ash indicated the presence of a large amount of potassium and magnesium, calcium was also present, but we railed to obtain indications of sodium. The acids consisted of earbonic, phosphoric hydrochloric, with traces of sulphuric, acid We also obtained from the dried tubers very marked quantities of potassic nitrate, so that when they had been incinerated they behaved very like

See Jour As a se See Beng , LVII , Pt II , No 1 for 1888



____ COMBRETUM Bladder Senna ovalifolium. COLUTEA, Linn , Gen Pl , I , 505. 103, LEGUMINOSE. 1740 Colutea arborescens, Linn, var. nepalensis; Il Br Ind., II. THE BLADDER SENNA, NEPAL BLADDER SENNA. Syn -C hepalensis, Sims , Bot Mag , t 2622 Vern-Brda, LADAK, AFGHANISTAN References - Brandis, For Fl , 136 Gamble, Man Timb , 118 , Stewarts Ph. Pl., 64, O Shaughnessy, Beng Dispens, 294; Fluck and Hanb, Ph. Ph. 64, O Shaughnessy, Beng Dispens, 294; Fluck and Hanb, Pharmacog, 221, U.S. Dispens, 18th Ed., 1298, 1617 Murray, Pl. and Drugs, Sind, 131, Royle, Ill. Him. Bol., 1, 195, 198, Treasury of Botanu Habitat - A shrub of the temperate west Himálaya, Kunawar, Tibet, Nipal, &c , at an altitude of 8 000 to 11 000 feet Medicine - The leaves of this plant are purgative, and are used to MEDICINE adulterate officinal senna, and in some parts of Europe as a substitute for Leaves senna, though comparatively feeble in their action. They are adminis-1741 tered in infusion or decoction in the dose of about half a pint (U. S Dispens , 1617) Colza Oil, see Brassica campestris, Linn . var Napus, B No 810 COMBRETUM, Linn, Gen Pl 1.688 I COMBRETACEÆ Combretum decandrum, Roxb , Fl Br Ind , II , 452 . Veta — Dhobela, Chindwara, Punk, Gonda, Oudh, Arikola, Tel. Kali lara, Nepal., Pindik, Lepcha 1742 References — Rosh, Fl. Ind., Ed. C. B. C., Brandis, For Fl., 221, Gamble, List of Darjeeling Climbers, &c. Habitat — Abundant in Bengal at altitudes up to 3 000 feet Very common in the North Deccan plateau, in the North Western Provinces, Tenasserim, and the Andamans Is said to be used medicinally, but very little is known regarding the uses of the plant The Santals, who call it atena, make baskets from its 1743 long thin stems (Campbell) C. nanum, Ham , Fl Br Ind , II , 457 1744 Vern -Dant 1 dths, pharses, N W P and PB References -Brandis, For Fl , 221 ; Baden Powell, Pb Pr , 350 ; Royle, Ill Him Bot , I , 209

MEDICINE. 1745 1746

Habitat -A decumbent, low shrub of the Himálayan terai, from Sikkim to the Panjab Medicane -Mr Baden Powell mentions this plant among his medicinal plants of the Panjab

C. ovalifolium, Roxb

Vern .- Bandı káttu tige, yadala chettu, bandı köta, Tel. (the buffalo-

A common climber throughout the Deccan Peninsula, probably eaten by buffalos

1747

COMBS, fans, brush backs, and other smaller articles-Woods used

for -Adına cordifolia (combs) Alangium Lamarckii (cittle bells) Albizzia stipulata (critic bells)

Artocarpus integrifolia (brushbacks) Banhinia Vahlu (umbrellas, run-

Buxus temperatens finstruments.

combs, small boxes) Carissa diffusa (combs) Casearia tomentosa (combs) Chloroxylon Swietenia (picture-

frames, brush backs). Cordia Macleodii (picture frames) Co saria nepalensis (small articles) Corypha umbraculifera (fans, umbrellas)

Cratæva religiosa (combs) Elmodendron glaucum (combs,

picture-frames) Gardenia costata (combs) G latifolia (combs)

G lucida (combs) Gmelina arborea (picture frames) Olea ferraginen (combs) Platanus orientalis (pen cases)

Psidium Guava (instruments) Pyrus Pashia (combs. tobaccopipesì

Schrebera swietenioides (combs and weavers' beams) Stephegyne parvifolia (combs) Sterculia urens (guitars)

COMMELINA, Linn , Gen Pl , 111 , 847

1747 Commelin. 1748 Clarke.

or diya menériya, Sing ;

IMPLINACES: aka, kanshira káchradam, iura, kanna, PB , hhanna,

References —Roth, Fl. Ind. Ed. C.B.C. 37 Tout, Hort Sub. Cat., 605, Throates, En. Cepber Pl. 31; Dal. & Cab. Bomb, Fl. 323, Steart Pb Pl. 326, Authorion Cat Pb and Sund Pl. 148, Trinen Syst. Cat., 95. DeCandelle, Mono Phaneregom, III, 159, Rev. A Campbell, Descript Cat of the Pl. Chutta Nagper, U. C. Dutt, Mat. Med. Hind., 303, Marray Pl. and Drugs, Sund, 32

Habitat -A native of wet places all over Bengal (Roxb) It also occurs in the peninsula of India generally, and in Sind, Salt Range, and the Deccan Dalzell and Gibson say that it is common everywhere in Distributed to Burma, Malay, and China

Food - Leaves eaten by the poor people as a pot herb especially in The fleshy rhizomes of some of the species of this times of scarcity genus contain much starch, mixed with muchage, and are therefore wholesome food when cooked Balfour says C polygama (a name which would appear to be a synonym for C benghalensis) is cultivated in China as a pot herb eaten in spring "The juice of the flower is used as a bluish pigment in painting upon transparencies" (Smith)

C. communis, Linn , DC , Mono Phanerogam, III , 170

Vern - Kena BOMB Wek kyup BURM Stewart says that this, as also C benghalensis are in the Panjish known as Chura kanna Balfour grees the following names Kanang kirat, kunnu katis pillu Tam, Venna deei kura nisu kassutu, venna mudra, venna tedara Tet., Vatsa gram Sans

It may be here recorded of the vernacular names given to this and in fact, to all the species of Commelina that they require to be verified and assorted under the modern scientific names for the species of this genus

FOOD Leaves 1749 . 1750 Pigment. 175X

1752

2 L 2

COMMELINA suffruticosa.

C. 1762

### The Spider worts

suffruticos	a. The Spider worts
	References Vingl, Hart, Sub, Lat, opportule, or Give, Romb Fl., 1927 Structs, FS Fl. 30; Attabasen, Lat, 15 and Stat 11, 148; Balfones Crel gading flatin.
	Habitat.—A native of the hot damp regions of China and Japan.  From Chitagong, plants are said to have been sent to the Baan of Gridens, Calcutt.  What it is feared a good deal of the con- recorded under Community should be recorded under The information that  could not be established as referable to either of these plants has for the
FOOD.	and the second s
1753 163161 1751	calves when they with to wern if em from their milk," "The leaves are eaten by the natives mixed with other greens."
1755	[ Com. ard Cirt. Table I. Commelina nudiflora, Linn.; DC. Mono, III., 144; C. B. Clark's
-735	Syn,—C. Cestitosa, Roed, Fl. Ind., Fd. C. B. C., St., C. Nudiflora, Linn., as described in Roed., Ff. Ind., Ed. C. B. C., in Amelicana Ruel- Florum, Linn., the Kunddie of Hoggid.
	Hablat,—Frequent in Bengal, and distributed to Burma, Ceylon, and the Malay, also to Africa, Madagaster, Mauritius, Sandwich Islands, and Australia, &c.  Compare this with the remarks under C. communis, Linn., and C. obliqua, Mam.
1756	C. obliqua, Ham.; Clarke, p. 19, pl. IX. Syn,—C. communis, Farb, Fl. Ind., Ed. C.B C. 57.
1	Vern.—Kanjurd, kâna, Hind.; Jata-kanchura, jata-kanshira, Beng; Korna, kâna, Bijvon; Kanjura, Kunaon.
	Habitat—This species is common over the low moist parts of India, flowering during the rainy season chiefly. It also occurs on the lower
MEDICINF.	Control of the contro
1757 FOOD. Root.	Committee of the American Committee of the Committee of t
1758	C, salicifolia, Roxb., Fl. Ind., Ed. C.B.C., p. 58.
1759	Vern.—Yalapippalı languli, Sans.; Pani-kânchirâ, Beng.; Yalpipari, Hind ; Bir kana arak', Santal
{	References. DeCandolle, Mono Phanerog , III., 157; U. C. Dutt, Mat. Med. Hind , 300.
FODDER.	Habitat.—Common in wet places in the pennsula of India, especially in Bengal, Coromindel, and Bombay. Distributed to Burma. Fodder.—Cattle are said to be fond of this plant.
1760	C. scapiflora, Roxb; see Aneilema scapiflorum, Wight.; A 1122.
1761	C. suffruticosa, Bl; DC., Mono. Phanerog., III., 188.
MEDICINE. Root. 1762	Vern.—Dare eria, SANTAL. Habitat.—A native of Bengal. Medicine.—The root is by the Santáls applied to sores (Campbell).

Products of India	3,
	ONNARUS onocarpu
Conch Shell, a species of Turbinella, see Shells, also Beads, B 38r. Condiments, 38 S pices	
Conessi Bark, see Holarrhena antidysenterica, Wall, Apocynace.	ł
CONGEA, Roxb , Gen Pl , II , 1159	
Congea tomentosa, Roxb, Fl Br Ind, IV, 603, Wight, Ic, Veta—Tamakanse kayan Burm References—Kuri For Fl Burm, II 256 Roscoe in Roxb Fl Ind, Ed C B C, A	1763
Habitat—A large climber in Chittagong and Burma, distributed to Siam Roxburgh says it is found also in Coromandel, where it flowers in the cold season, the Chittagong plant flowering in March The Flora of British India describes a vanety—Azurea—as cultivated in North India All the species of this elegant genus are characterised by their purple bracts	
C. villosa, Wight, Ic, t 1479, fig B, Fl Br Ind, IV., 603	1764
A large climber of Pegu and Mergui, the leaves of which are used medicinally (Mason, O Snaughnessy, &c)	
CONIUM, Linn, Gen Pl, I, 883	İ
Conium maculatum, Linn ; DC , Prodr , IV , 242 ; Umbellifere Spotted Hemlock, Hemlock, $Eng$ , Cigue, $Fr$ , Schierlings, $Gcrm$	1765
VernShowkran ARAB; A rdamino Boub	
References — Phorm Ind., 104 Annile Hat Ind., Preface & XIII. O'Shaughnessy Bong Dipens., "50 Dymock Hat Hed V Ind., and Ed., 373; Flück & Hanb Pharmacog 259 301 U S Dispens., 15th Ed. 194 445 Bent C Term., Med 11, 118	Ì
Habitat Met with in Europe and temperate Asia, common in England	]
Medicate —Although this drug is commonly used in Indian pharmacy and largely imported no effort seems to have been made to cultivate the plant intletemperate regions of Indian drug the Greeks (the State poison of (hirdroof) Dymock says the	MEDICINE. 1766
not appear to have been ut lized b "The seed is sold for 8 annas per D.	1

CONNARUS, Linn , Gen Pl., I, 432, 1001

Very little is known regarding the Indian species of Connarus and

attord a useful oil

Connarus monocarpus, I int , Fi Fr Int, II., 50, Connaracre Verm.—Seader, Bone ; Anda low, a disc, tomot, B en ; Fals I in, Sing

--6S

CONVOLVULUS arvensis

Connarus, Deer's foot Bind-weed

References -Beddome, Fl Sylv App L11

References — Beddome, Fl Sylv App LAVAII Wight and Arnoll, Prod Fl Pen Ind Or, 143 Thw, En Cey Pl, 80, Kurs, Pegu Report, Bomb Gas AAV, 330. Dals and Gibs, Bomb Fl, 83. Rheede, Mal, VI, 1, 24

Habitat —A small tree or shrub of the Western Peninsula, from the Concan to Travancore, common on the Southern Ghats, very abundant in Ceylon I lowers yellow, fruit long, bright red, the tree becoming very ornmental when in fruit

L Oil - The seeds yield an Oil

Structure of the Wood - The timber of this, as of most other species of the genus, is much valued for ornamental purposes

Connarus nitidus, Roxb, in Hort Beng, 49

References - lorgt, Hort Sub Cal 265; Gamble, Man Timb , 114

Habitat -Said to be found in Sylhet and British Burma

Oil -Dr McLelland says that in Rangoon the seeds of this plant yield a quantity of sweet oil The name C mitidas is not referred to by the Flora of British India, but it may be presumed that the plant which yields the oil in question is C paniculatus

C paniculatus, Roxb, Fl Ind, Ed C B C, 505, Fl Br Ind, II, 52.

References -Kurs For Fl Burm, I, 327, Gamble, Man Timb, 114,
Wighl, Ill 164

Habitat —Roxburgh followed by Voigt and Kurz describes this as "a large timber tree, but Hooker in the Flora of Britisk India 5193 its 'a large climber' met with in Sylhet and the Khasia h lig, to Chittagong"

C speciosus, McLell

COMBRETACER, A 1146

Vern -Gnedoak kadon kadet BURM Habitat -Sa d to be a large tree of Rangoon Pegu and Tounghoo

Oil — McLelland says that the seeds yield an abundance of s seet oil.

The above has been extracted from Dr. Gookes Report on Oil.

Seeds The name C speciosus McLell, was taken apparently, from Bilfour's Cyclopadia. It seems probable that the tree here alluded to is
C gibbosus Wall—a large tree met with near Rangoon and in Tenasserim Penang and Singapore. The Burmese name Gue (Spondias

mangifera) seems very near to the above
Structure of the Wood —Balfour says of C speciosus 'It has a large, heavy, and strong timber, white coloured, adapted to every purpose of house bu lding"

Conorarpus acuminata, Roxb see Anogeissus acuminata Wall,

C latifolia, Roxb see Anogeissus latifolia, Wall, A 1149

Construction and Railway purposes—Timbers suitable for, see Cart and Carriage Building C 632

CONVOLVULUS, Linn, Gen Pl, II, 874

Convolvulus arvensis, Linn , Fi Br Ind , IV , 219 Convolvulacez.

Deeks foot bind weed

Sta — C Malcolmi Roth Fi Ind , Ed C B C , 159

C. 1777

1760 TIMBÉR 1770

1771 OIL

1772

1774

011 1775

TIMBER.

Scammony

CONVOLVULUS Scammonia.

V - " - ' me writers hiran paddi, PB, HIND,

il, 362 Dals & Gibs, Bomb Fl hison Cat Pb and Sind Pl, 98; 02, Murray, Pl and Drugs, Sind, Medical Top of Ajmir, 150. Baden

Habitat —An abundant weed of cultivation all over the plains of the Pa 40 at 1 and 5 from Kashman to the Docean ascending to 100 see.

black soil

Medicine — The officinal hiran paddi (or harin paddi) appears to be MEDICINE.

this plant. The roots possess cathartic properties. Murray says the roots are sometimes used by the Sindis as jalap.

Fodder -Vers is a dark green weed, usually found in wheat fields. It is said to be greedily eaten by goats and cattle, and is gathered by

Root 1778 FODDER 1779

1780

1781

Convolvulus Batatas, Linn , see Inomea Batatas, Lamk

C. parviflorus, Vahl; Fl Br Ind, IV, 220

Vern - Alaranys, TEL

village children as a fodder.

of

A native of Assam, the Deccan Peninsula, and Ceylon, but largely cultivated throughout India.

C. pentaphyila, Linn ; see Ipomea pentaphylla, Jacq.

C pluricaulis, Chois; Fl. Br Ind, IV, 218

Vern -Porprang, gorakh panw, baphalls, dodak PB

References.—Stewart, Pb Pl, 150, Attchison, Cat Pb and Sind Pl, 99
Habitat.—A common plant in many places throughout the plains of

Panjáb, Hindustan, and Behar
Food and Fodder,—"It is eaten by cattle and is reckoned cooling, and

root and rodger,..." It is eaten by cattle and is reckoned cooling, ar used as a vegetable or given in sherbet" (Stewart).

FOOD and FODDER. 1782

C reptans, Linn ; see Ipomœa aquatica, Forsk.

C. Scammonia, Linn, DC. Prodr, IX, 412.

1783

Vern -- Mahmudah (1), sakmunia, PB, Sugmonia, sák munia, HIND, SIND, ARAB, PERS

References —Kurs, For Fl Burm, II, 213, DC Origin Cult Pharm Ind., 153 O Shaughnessy, Beng Dispens, 500 Dymock, Mat Med W I Vol 15th

15th 93 [reine, 11 41 11 ca 141 4, 14

Habitat —A climbing perennial, native of Syria, Asia Minor, and Greece Cultivated in some parts of India

Gum resu.—A gum-resin imported into India It is obtained by incision from the living root. It occurs in irregular pieces of an ash grey colour and rough exterior. When broken, it presents a resinous surface, and of a shining black colour when dy. Thin pieces are translucent and

GUM-RESIN. 1784

# COPPICE or COPSE.

### Plants for Coppleing.

greenish. It has a cheesy odour and flavour. The bazar Scammony in Bombay, Dr. Dymock states, is all false, and is made at Surat

Conyza alopecuroides, Lam., see Pterocaulon alopecuroideum,

C. anthelmintica, Linn.; see Vernonia anthelmintica, Willd.

C. balsamifera, Linn.; see Blumea balsamifera, DC.

# 1785

# Cooawanoo Oil,

This oil is said to be prepared from the Chelonian reptile Caouna olivacea, Gray-see Turtles.

Cookia punctata, Hask; see Micromelum pubescens, Blume, Var. 1st; Rutacem.

# 1786

Copal Gum, or Gum Anime.

A hard, transparent substance, resembling Amber, found as a natural exudation from certain trees. This substance is chiefly obtained from Zangit

ing to but th tion. much s masses

chiefly Brazili Copal

by Guibourtia copalifera, and Indian Copal from Vateria indica, which see. The Australian and New Zealand Copal is the produce of Dammara australia (Conterne) This forms large solid masses, often found in places where the trees do not now occur, and in New Zealand is known as Kaurs and in European Commerce as DAMMAR or Cowner PINE.

Copper, see Cuprum.

# 1787

# Coppice or Copse-Plants sunable for-

The following, among many others, are plants specially mentioned as suitable for this purpose; but those given under Hedges and under Pollard may also be added:—

Acacia arabica,
Acer Campbelli
Albizza Lebbek
Anogerssus pendula,
Banhnia Vablii.
Carssa diffusa.
Castanopisi indica.
C. tribuloides.
Casuarina equisettifuia.
Cedrela serrata.
C. Toona
Celtiu sustrafis.
Daiberray latifuia.

Hentiera littoralla.
Lagerstroemia parvifora.
Lebdiereopsis orbicularis.
Mosa montana.
Odina Wodier.
Pithecolobium dulce.
Pospula suphratica.
Prosopia spicigera.
Quercus acuminata.
Q. semecarpfolia.
Streblus asper.
Tencram macrostachyum.

Helicteres Isora.

Coptis or Mishmi Teets.	
Copra or Khopra—The dried kernels of the cocoa-nut, see Cocos nucifera.	
COPTIS, Salisb.; Gen. Pl., I., 8, 953.	1788
The name Corris has been given in allusion to the much-cut leaves of the plants which have been referred to this genus.	
Coptis Teeta, Wall; Fl. Br. Ind., I., 23; RANUNCULACEE.  COPTIS OF GOLD THREAD, COPTIDIS RADIX, OF MISHMI TITA.  Vern.—Tità, Ass.; Mamira, or Mamirai (DYNOCK), HIND; Mahmirai, SIND, Pila karosama, SIND. Rice says that life is a corruption of tikia, Sans, "butter"  References.—Vergt, Hort. Sub. Cal., 3; Malisaae, Trans. Med. and Control of the Contro	

Habitat.—A small, stemless nerb, with perennial root-stock, met with in the temperate regions of the Mishint Hills, east of Assam. Oooper says that the plants grow on the ground among the moss around the stems of trees. "From each root," he remarks, "springs a single stem, about four inches high, bearing three serrated leaves, attached to the head of the stall-like elongated trefol."

Pereira (Pharm Jours, XI., 1852, p. 204) was the first to suggest that tests root might be the Maµµqq or the Maµµqq of the early European writers on medicine. He founded this opinion mainly on the fact that mahmfu is the name of a drug used in Sind in the treatment of eye

ch the Maµipas was emimported into India from which, he says, possessed a and the Chinese plant vang-lien. Sc.,) have by

modern writers been recognised as Coptis

pang-lien, (Sc.,) have by
Dymock says mamirán is

rium clears the sight, and as a snuff the brain, and that it relieves toothache. Internally it is given in jaundice, flatulence, and visceral obstructions." (Mat. Mtd. Witt. Ind., and Ed., 18).

Dymock further remarks that two kinds of the drug are at the present day met with in Bombay. The best quality is only about the thickness of a crow-quill or a little thicker; it is a yellowish thirome, hav-

1791

HISTORY.

1792

drug now generally recognised as obtained from Picrorbiza Kurroa. Dr. Dymack thinks there is but one root sold in India under the name of furd, but in connection with the Calcutta International, and again with Little I'm I'white and I amban, the writer had three or four . . . . . ... in ame of kuri. He is, . . . . . . . . . • . . . drug must be regularly sold in the Beneal drug shops. Gentiana Kurroa, chips of the root of Coscinium fenestratum, Swertia Chirata, and other substances are frequently offered as kuru. May it not be possible that one of the roots known in lower India as kurd is in the upper and western provinces sold as titd. This suggestion carries with it additional strength from the well-known fact that a considerable trade is done from Kumaon and also from the Khasia Hills in the root of Thalletrum foliolosum-filijari-as a substitute for Coptis; and along with this it seems likely that Actors Both these are abundant plants, ent for the present to tita. But it may be . id, indeed, as already stated, if even the plant exists in any part of the Chinese empire. The

true titá sold in Upper and Western India may thus be mishmi-titá that may have found its way by re-exportation into the returns of the Chinese

Coptis or Mishmi Teeta.	COPTIS Teeta.
drugs imported into India, or may have been conveyed overland from the Indo-Chinese frontier to Chinese ports. Hence, as far as our present information admits of conclusions being drawn, there exists a strong probability that the bulk of the Chinese drug is not Coptis Tetta at all, but the root of some more easily procurable Jana.	HISTORY.
The tans. The suggestion alone that much of the tits sold in India might be Pierothias was made before the writer thought of consulting Sir Joseph Hooker Intending in General; and it is, therefore, almost safe to add that the Tibetan name hoonline may have been the original of the Chinese honglane, hrangelien, southing, S.C., and hence Dr. Pereira it.	1794
ference that, in ancient times, there may have existed a much larger export in tital than takes place at the present day. It is much more likely that a possible, however, that in later times the Chinese supply may have been	[
the treatment of cyc-diseases, simply, I believe, because it has a yellow watery june, as every plant with a yellow june seems to be by them considered a sovereign medicine, and all are called indiscriminately manifain. He further states that the roots of Geranium Wallichianum were shown to him as a medicine called "mam-f-ran". It has been pointed out by chemists that both Coptis and Berberis	1795 1796
after the same fashion as the Mauspás of the ancients. But berberine is present in a great many other yellow and bitter substances, and it may therefore have been a mere coincidence (suggested by external appearances) that the root now called mamfrán and the Mauspás came to be a faith and for the same faith and fai	1797

Dictionary of the Leonomic
Coptis or Mishmi Teeta.
ing spine is projections where the roots have been broken off. The whole that me is funted, but the upper end is often more distinctly so, and the recruims of the sheathing lead-stable are often attrached. The second kind is considerably thicker and covered with thin ways rootlets; it often branches at the croan into two or three heads, which terminate in tules of leas-stable compeled together, and not separate as in the first kind. Both of these thirds are recruited to the spongy, and it is spongy, and it is propayed to the spine of the stable continuer to the spine of the stable of
that we do not know the plant which yields the Chinese drug. In Japan Copils anemonatolla affords a medicinal root, and it is, therefore, just possible that a portion of the Chinese drug may be obtained from one of the allied genera. Copil- Isopyrum or Helleborus, although possibly an undescribed species. Mr. Ohristy (New Com Pl. and Drugs, No. 4, p. 53) says—"The Japanese character (*oh-ren,* meaning yellow ren), is exactly the same as the Chinese one for 'heang-lien,* which is the rhistome of Copils Teeta, Wall, and not a Justicia as stated by Dr. Smith in his Chinese Materia Medica." May it not be possible that the Copits Teeta to which Christy alludes is the drug as described in the Plarmacrographia? Dr. Dymock's account of the imported Chinese thicker form of the mamira of Bombay recalls, however, some of the forms of a drug sold in Bengal under the name of Kathi to Kathi (Kathis, Sans)—a drug now generally recognised as obtained from Picrobiaza Kurroa. Dr. Dymock thinks there is but one root sold in India under the name of kurd, but in connection with the Calcutta International, and again with the Colonial and Indian Exhibitions, London, the writer had three or four widely different roots consigned to him under the name of kurd. He is, of the root of the Colonial and Indian Exhibitions, London, the writer had three or four widely different roots consigned to him under the name of kurd. He is, of the root of the content of the conte
C. 1793

Cort a or Mulmi Terra.

Teeta.

drings my errol in o In Isa, or may have then consepted extelland from the Isa Solt neither from the role the note ports. Hen o, as far as one of present in the matter a line of control is one to make problems, the role of the solt of the Charles of the problems, the role of the the control of the the control of the control of the Charles of the Cha

fort of some more eas 's prixical optact.

Br J D Hooker, who is it profits kkim, excited from eat traders, ent with prost ! a figurier, a present "ed abor ! aled the eres ed ene ef the mark better boths called in Bengal fortage but be a list the present was that of Picrothing a plantage it to the Society labels process at form 12,000 to 15 confect e evalum, and is a powerful toter card to mine to the Titerans". The surges on alone that man it the fiff s 'd in let' a melt le Pictorles was male bet en the un'en the inte ek comsistent Sir Joseph Hockers Himd as in Tereralis and it is, therefore, almost sale to add that the Tiberan came from the man have been the enternal ed the Cl neve fore ane, brane-hen, con-line, Ac , an I berce Dr. Pereira may have been mitaken inteferting the Moutoated the are entito Centis Terta, since it is this imported Cl. near drug that is the mamirian of Upper Lurther, it seems even on at e that the knowler, sellem, often tam fiedtl izomes of Piccertiza -accord ne to modern writers the spurious mamiran of the Indian farme-may have been the drug enginally to called, or at least been the Ind an drug which most close's reseml 'ed the er at a te tamma famaba

the state of an arm of the state of the stat

ference that, in ancient times, there may I ave existed a much larger export in titá than takes p'ace at the present day. It is much mee likely that a drug found if roughout the Himkling would have been in early times carried to the drug-sh me of Central, Northern, and Southern Asia rather than that the root of a plant I rind only with n a very limited area of an inaccessible country should have come to be in extensive demand possible, however, that in later times the Chinese surply may have been d ann from the Assam frontier, and ultimately consisted, to some extent, in the admittedly superior root of Coptis Teets, until modern writers came to seem the mameran as Coptis and n ! Picrothica. Dr Altchison, in his second paper on the flora of the Kuram Valles, says "Lattis year, collected Corydalis ramosa, a plant employed medic nally by the natives in the treatment of eye-diseases simply. I believe because it has a yellow waters juice, as every plant with a yellow juice seems to be by them considered a sovereign medicine, and all are called indiscriminately mamfran" He further states that the roots of Geranium Wallichlanum were shown to him as a medicine called "mamilian"

It has been pointed out by chemists that both Coptis and Berberis contain a large quantity of the alkaloid berberine; and this somewhat significant fact has to be added that the drugs obtained from these plants are used in catarrhal and rheumatic affections of the conjunctiva very much after the same fashion as the Maping of the ancients. But berberine is present in a great many other yellow and bitter substances, and it may therefore have been a mere coincidence (suggested by external appearances) that the root now called mainten and the Manifel and

1701

1705

1796

24

## COPTIS Teeta.

### Coptis or Mishmi Teeta.

HISTORY.

be viewed as militating against its having been adopted as a substitute for a drug for which Coptis would have proved more suitable. At the same time the Indian use of mamirán in the treatment of eye affections is but a Materia Medica

mamirán. The

Pictothiza was known to the earliest Sanskrit writers. The late Dr. U. Ö.
but

ica. Not only, therefore, were the words tild and mamiran unknown to the Sanskrit writers, but it seems conclusively established that even the drug Coptis Teeta is but of modern introduction into India. The Muhammadans were so little familiar with Picrothiza that they frequently confused it with Hellebore, and may thus be readily believed to have given to Picrothiza or to Coptis, when separately presented to them, the name of mamirán—the name of a drug which either or both may possibly have closely resembled. The Hindus are uniformly precise and accurate in their information regarding Picrothiza, but say nothing of Coptis. The earliest writers on Indian Materia Medica who allude to Coptis attribute to the indigenous and imported Chinese drugs tonic properties of remedial

value in the treatment of nervous diseases and in debility after fever; they rarely make any mention of its use as a collyrum in eye affections. The tonic properties of Coptis are possessed in a scarcely less degree by Pictoriliza; and it may be concluded that Mir Muhammad Hussain's de-

Collection. 1798

plant growing abundantly. The roots (from which, when brewed and plant growing abundantly. The roots (from which, when brewed and steeped in hot water, the famous febringe is made) are embedded in moss. From each root springs a single stem, about four inches high, bearmoss. From each root springs a single stem, about four inches high, bear moss. From each root springs a single stem, about four inches high, bear moss and carry them packed in tiny wicker-work bamboo baskets to Sadiya, where they are eagerly bought by Assamese and Bengali most chants.' Regarding to the Assam Govern that the Deputy Com

Com-1514 . 11 is brought t chittack each,

but the smallcers is out of all

tail price which the drug fetches. Dr. Dymock says of the Bonnoay supply: "Both

	with the second of the second
CORAL.	Teeta: Coral.
MEDICINE	"Thalletrum follolosum, DC., common at Mussooree and throughout the temperate Himálaya at 5,000 to 8,000 feet, as well as on the Khásta billo also affords a yellow root, which is exported from Kumáon under the name Momiri, and which it is possible may have been mistaken for Copti Teeta." "In Kashmir the roots of a Swertia are collected and tied up is bundles and are passed off as a substitute for Coptis. They resemble the true root greatly." (Surgeon-Major J. E. T. Attchison, Simila.) Se a previous paragraph, where a Coryadalis and a Geranium are state to have both been found to be used, in Afghánistan, as a drug called manufrán.
CULTIVA- TION. 1803	b
1804	CORAL.
	A calcareous structure formed by certain minute animals, which belong to
1805	
,	and the state of t
	Actinotos, calcar giving origin to . what resembling wall becomes calc
180 <b>6</b>	Ctenophora (or free swimming marine polypes) do not form a calculeous sheleton. Of the ZOANTHARIA two tribes, the ZOANTHARIA SCIERODERWATA sheleton.
	C. 1806

CORAL.

Coret

Habitat.—The Coral zone extends on either side of the Equator for about 1,800 miles. Mr. J. Murray, of the Challenger Expedition, has pointed out however, that within this area the corals abound most on the western side of the Atlantic and Pacific Oceans, a circumstance accountable for

coral luxuriates requires to have a surface-water temperature of 70%h, and to no.

deep-water has a temperature much below that in which the reel-forming corals can live, and this fact may therefore be one of the governing influences that confines the corals not only within certain geographical regions but fixes each species within its area to a certain depth of water in which abone it is found to grow. Beyond the area of the reel-forming corals, the ornamental corals occur, and luxuriating, under lower temperatures, they are found in tropical seas at much greater depths that the reel-form

low-wate cally so they wil

as the older landward and exposed portions are killed by being carried above the level of the water. This was the theory established by Darwin, and universally accepted for a quarter of a century, the atoils being viewed as monuments erected by the Actinozoa to a vast Pacific continent which had gradually sunk beneath the ocean. While this may take place, a new school has advanced the theory that it is by no means essentially necessary that to construct an atoil, the island which it encircles need be subsiding. Growth is attributed to the lood materials being most abundant along the face of the red, the approaching water being richer than that within the lagoon. It is even further explaned that the chemical action of the sea-water decomposes the dead corn, thus excavating the shallow basin for lagoon) that exists between the growing face of the red and the land. But if this theory be admitted we have to explain the fact that once upon a time a coral laying the foundation of the present face of the ref must have existed in, a depth of water under which we have no evidence of its having the power to live, or then presume the growing rim of the red to be advancing cup-like from a pedure cle situated at a depth in which the first portion of the colony found it possible to live.

at least be viewe theory be still ma tionably t level of th are being

A .- CORAL REEPS.

In the Manual of Geology of India, it is stated that the coral reefs of the Andaman Islands should become a source of cheap lime for Calcutta. "The idea has been suggested more than once during the past twenty years, and it is supposed that the only objection to it arises from the necessity for the presence of coasting vessels which would be involved, and the consequent risk of the convicts exaping; but with so pure a source of

reefs. 1809

2 / 0000013 0/ 1000000	3-9
Coral Reefs.	CORAL.
time, abundant fuel, and labour at command, there can be little doubt that Calcutta might be supplied with excellent lime at a comparatively small cost, and a useful and profitable occupation would be thus afforded for the convicts."	CORAL REEFS
"In 1828 some experiments were made by the Public Works Department with lime, at Barrackpore, from coral brought up as ballast from the Andamans The cost of the lime when burnt, exclusive of freight and collection, was from R85 to R85 per 100 maunds, as against the market price of Sybte lime from R85 to R90 per 100 maunds? "Opinions differ slightly as to the relative ments of the two limes, but on the whole the coral lime was considered equal to the other, whether it would answer best to burn the lime in the Andamans and bring it up slaked like the Sybte lime, or to burn it where fuel is more expensive, can only be	Andamans. 1810
determined by actual trial. In the Nicobar Islands upraised coral reefs are found on the coast of all the Islands and on the Car Nicobar, Bompoka, and several other islands these coral banks are of great thekness, and are raised 30 or 40 feet above the sea. The atolls arou	Nicobar. 1811
Wetons (Comman) short be tone of the deel of the	Sind. 1812
illied form, non " So s pass up unding in	
about the surface of scattered and Ran, indicating The species of cora	Bombay. 1813
The species of the fessor P Martin I Indica, Series XIV, nues: "The whole c management westward the series of the	Cutch. 1814

posed at low spring up to high tide level. The coral has very substitute for stone

for building, but not with very satisfactory results, owing to salt impregnation. The existence of shees dead oral reefs, so course, a proof that the existence of shees dead oral reefs, so course, a proof that the country has been rising during late times." Far to the south Mr Foote, in his account of the Geology of Madurand Tinnevelly, states that he country has account of the Geology of Madurand Tinnevelly, states that he country has a proving the rise of that portion of Inda. Writing of the scarp stress as proving the rise of that portion of Inda. Writing of the scarp of coral near the zemindar's bungalow on Rameswaramisland, he says: "Of its true coral reef origin there can be no possible doubt, as in many places the main mass of rock consists of great globular meandrinoid corals or of huge cups of a species of Porities which, beyond being bleached by weather action, are very stabiling a grand and the many stabiling and the many stabilin which they originally gre

I could ascertain, not have but in a well-section, a l

wanagar westward, dond and root

> Tinnevelly. 1816

Madura. 1815

55.	Ottionary by the Beonomic
CORAL.	Coral Reefs,
CORAL REEFS	Chattiram, the thickness of the coral reef exposed above the surface of the water is at least to leet, and probably much more." Further on his remarks: "At the Pamban end of the raised reef it shows a slight northerly dip, and masses of dead coral, apparently in intin, protuded through the sand below high water mark. Reefs of bring coral fring the present coast, but these I was the teer for with these I was the teer for with the reef now upraised, occurring as fossils in the latter, belong to species now living in the surrounding sea." "All the small islands occurring along the Timnevelly and Madura coast appear to consist of sand based upon coral reefs which relaxed to the sand that the surface with the surface, which is sandy one truth, orn lighthouse, shows no coral on the surface, which is sandy, but the island impossible to I was able to visit, that on which stands the Tutthorn lighthouse, shows no coral on the surface, which is sandy, but the island impossible to resist the speculation that it was this form and interesting account of these sub-recent marine beds, Mr. Foote adds: "It is impossible to resist the speculation that it was this
	to determine the same of the s
Trichinopoly. 1817	y on an old corat lling outlines of
	described by unaltered wa bedded corals shells, newly polished as t ing coast, with even their ng-zag colour-markings sumption vow, and hard by stretched a bank of coarse shingle that differed in no essential respect from a modern beach.  "But though, to an uncritical eye, the shells of that old sea might seem very like the volutes, olives, cownes, and art-shells now thrown upon the Madras sands (and perhaps, indeed, they were their remote Ances- tors), it needed but to look on the great coiled armmonites cattered five and there in the broken ground, to know of a surety that around me lay the relice of a cretaceous sea. When ! organisms, the coarse sandy deposits were slowly accumulating in a shallow fields and hop gardens of Surrey and tom of South-Lastern England, Nor.  C. 1817

#### CORAL. Omamental Corals. thousands of feet of white calcareous mud that, long since upheaved and hardened into chalk, greets the homeward-bound Indian in the Dover Cliffs, had yet to be slowly extracted through long ages from the sea water by minute organisms long since extinct." OBNAMENTAL CORALS B .- ORNAMENTAL CORALS. 1818 Very little can be learned for certain of the indigenous living ornamental corals. Indeed, it seems probable that in some of the passages already quoted, reference has been made to coral a a governo reof the forms there mentioned being, s here made should be preserved, since, for ornamental purposes, it is or a calcareous substance of sufficient White into ornamental structures 1810 various forms, shapes, and colours ar Brainstone. (Oculina virginea), "brain-tone cora" "organ-pipe coral" (Tubipora musica), ii e sca-pens 1820 Organ-pipe. the "sea shrubs" (Gorgonida), the "black coral" (G Antipathes), and 1821 last but by far the most valuable of all the "Red Coral" (Coralium rubrum). Sca-pens, 1822 Most of these genera are temperate, but the Gorgonida attain their great-Shrubs. est development in tropical seas "White coral," of no market value, is 1823 Black. 1824 Red 1825 Burman, of the coast of Amherst and Mergui that elegant specimens of Activita are very rare, but he describes a species of Menorita which he calls "club-shaped Porites". He also says —"I have noticed in the 1826 bazars, though I have never gathered it on the coast, a curious species of coral resembling the horse-tail Isis It is branched like a tree with white strated stony joints and black horny smaller joints between, which render the whole flexible." It may be here remarked that many of the sclerobasic corals have alternating portions of a calcareous D . . . .

Tenasserim 1827

commerce, 12 does not grow like that, and the red colour 15 confined to the epidermis, the substance of the coral within being grey."

In concluding this brief review of the literature of the Indian ornamental corals, it must be admitted that we are grossly signorant of the subject. There are no coral fisheries in India, and we do not know whether or not this is due to the absence of corals of commercial value, nor do we possess any knowledge as to the likelihood of the more

CORAL.	Trade in Corals.
TRADE.	valuable corals succeeding, if introduced into Indian waters. No effort has as yet been made to propagate new species or improve the existing Indian corals.  Trape in Coral.
1820	
	Some conception may be arrived at of the magnitude of the trade in Coral when it is recollected how many races of people in India regularly wear necklaces of coral. How far the prized ornaments may be derived in the coral is obtained pale colour, are said to be the operation of preparing piercing, and rounding; but in accomplishing these operations there is generally an immense wait. The rejected pieces and inferior qualities are exported to Asiatic countries,
	have been partly caused by the imposition of a duty of 71 per cent. III April 18 Of the year
Prepared.	these in again
1830	(L2,000)
	the d amount received
	by O'Conor says of
Beads. 1831	The County says of
imitation. 1832	8 2
	bought by these classes to be worth gold beads. Almost all the coral a man is prosperous, alternating with gold beads. Almost all the coral we receive is brought to Calcutta, whence it is distributed over the provinces mentioned, to be sold chiefly at the larger fairs. It is principally inces mentioned, to be sold chiefly at the larger fairs.
	and the more important trade, the Indian importance of
	least of Indian pre-
	ess a large commu- by the Hindus. A
	rnating, but in the form the favourite
	imitation cofals.
	for sale at fairs are
medicine. 1833	real.  Medicine.—In addition to being used for adornment ornamental  wery ancient time and are  "is purified by being h pearls and corals are
	used for the same purpose, namely, in "urinary diseases, consumption, weak persons" Ainslie ed coral when calcined

Corallocarpus.	CORAL wort.
CORALLOCARPUS, Welw; Gen. Pl., I., 831.	
[I., 1. 503; CUCLEBITACE E. [I., 1. 503; CUCLEBITACE E. Corallocarpus epigea, Hook. f.; Fl. Br. Ind., II., 628; Wight, Syn.—Bryonia reigea, Rottler.; B. Glabra, Rotb.; Archinandra reigea.	1834
Vern Rikergeddah, Hirach J. Kerzinai, Boun.; Rektargaddah, granj-hal, DrCi; Gellan kénsi kirkangu, ddishargarudan, tinai gaddah, granj-hal, DrCi; Gellan kénsi kirkangu, ddishargarudan, tinai gaddah, granj-hal, DrCi; Gellan kénsi kirkangu, ddishargarudan, tinai gaddishargarudan, tinai gaddis	
Habitat—A herbaceous climber, mer with in the Punjab, Sind, Gujrát, and south along the Deccan Peninsula to Belguum Distributed to Ceslon Alestie, Rottler, and Druyrag it is also a ratise of Coromandel.  Medicine—"The root is of varying thickness and length, and much resembles that of Momordica diorca, being in shipe not that unlike a tis sychoush-white and shiften medical merchanism of the properties of	MEDICINE. Root. 1835 Juice. 1836
also in medicinal quantity. Ainsue also states that for external use in chronic rheumatism it is made into a liminent with cummin seed, ontons, and castor oil. It is considered an anticleman a and dack to extend the Deccan and in Mysore it.	1837
remedy for snake-bite, being ad nally to the bitten part. The au cur with Ainsien that this drug c' and its properties tested.  Chemistry — A bitter yellow uncrystallizable substance has been found in the root which is probably allied to Bryonin, the bitter principle of Bryonia dioica. (For the Medicinal and Chemical Properties of Bryonia, see Dymock, Mat. Med. W. Ind., 2nd. Ed., p. 353, and also U. S. Dispens, 392). Conf. with Bryonia, B. 94.  Coral plant, see Jatropha.	CHEMISTRY, 1838
Poter brand an Introluct	

Coral tree, see Erythma. Coral-wort, see Dentaria buibifera. CORCHORUS acutangulus.

The Angular Fruited Corchorus.

JUTE. 1839

# CORCHORUS, Linn.; Gen Pl. 1, 235.

The generic name for this group of annual plants is derived from the property of the braises (app the pupil of the eye, and appra to purge or clear). There are about 36 species distributed throughout the topics, of which india processes 8. But so uniformly are these plants met with in Asia, Africa, and

classes of the people take them builed with other vegetables in the tormul sours as stomaches or appetizers, the lower classes use them as articles of food." Sir Walter Elliot gives C. otherms the Telegin name of Printa

ampelos Pareura,
s and of Jute has
writer accepts as
bable that hybrid or

x840

Corchorus acutangulus, Lam; Fl Br. Ind, I, 398; Wight,

Syn -C vuscus, Roxb, Fl. Ind, Ed C.B C, 429, Ic t 739

Vetti.—Titópát, Beng References —Daís and Gids, Bomb F1, 35; Lura, Contrid Eurresse F1, 130, F von Viueller, Sel Extra Trop F1, 88

Botanic Diagnosis —Stem harry along certain sides between the nodes (not all round), the whole petiole having spreading hairs, and being woilly along the upper surface, both surfaces of the leaf harry, those of the upper adgressed, margin often minutely clinter, nervules reticulate (not parallel anastomising, as in C. olitorius) Capsule short (i inch long at most); winged, beak cleft into 3-4 spreading arms each, olten bird, base of capsule contracted, postenion of laded hower indicated by a sharp groove. Seeds small, broader than long, squarish, hilum a large thickened patch in one cornet.

A very distinct, and perhaps the most abundant wild species in India,

parts of amy and having e row of a com-

a synonym tor

plant, and sshand as the bazar name for the seep shandles to the above association of the scientific names morrect, but bophalls is the name given to C. Antichorus, and sthand, the seeds, to C. trilocularis

### The Roand Fruited Corcherus.

CORCHORUS capsularis.

Mr. Hem Chunder Kerr speaks of this as "the speeces C. forcus, or the feel sancty of C. capsulans". It would almost seem pees ble that from C acutargu'us and C. th'ocularis the cultivated forms of jute might have JUTE

the tipe spreading somewhat as in C. acutargo'us. Duthie's 7,121 liss the filinge, capsules, and hairs of C. tri ocularis with the seeds of C. o'iro-Tius "

TITTE. 1841

Fibre. - A course fine is some mes estracted from this speeces and Whether al udes to this plant as an excauoral write of jute

1212

[1. 1073 Corchorus Antichorus, Rausch ; D. Br. Int., L., 308, West, Ic.

STO -CORCHORI & HURILIA, I'MATA ANTICHORI & PEPRETULA, LAN Vern -B skule thinn : Baskie's, kirant, topkalit, takeskal i, takuna, Pr. : Nathiri, Sinn

References .- Dale, & Gila. Bent Fl. 351 Hurray, Fl & Druet.

Sint. Ft. Habitat. A common prostrate, shrid by, plant, aild in Upper India, from the NeW. Prostness to the Punjib and Sind, and southwest to

Kith in ir, Gujrit, and the Decean-a member of the Indian desert flora. Distributed to Afghartstan, Aden, Tropical Africa, &c.

FIBRE. HEDICINE. 1844 FODDER.

con st 1 by camels

C. capsularis, Linn , Il Br Ind . I , 397; Wight, Ic , 1 311.

Vern -Ghi nali'd-fat (accord of to Roxburgh), Aarchd according to U O Dutt), Hevo The last mentioned author in the Glossery to his Mar Med of the 11 adas gives this plant the Samikrit name & Alas Ako

In Rengal the words pit and limbil are often given to both the pite-yield-

1845 1816

1847

names for C. Capsularis during an enquiry instituted in 1874 into the sub sect of the jute cultivation in Madras.

# CORCHORUS capsularis

### The Round Fruited Corchorus

JUTE

References - Das Dr. DeLandolle, Orig Cult 11, 131

Botanic Diagnosis,-Alone distinguishable from C olitorius by the short rounded cipsule-avery unimportant character. Gamble s No 15,912 has one capsule nearly round, while the others are distinctly those of olitorius, but some are 4 valved, others 5-valved Kurz s No 1231 of Cacutangulus has both 4- and 5-valved capsules, and Clarke s No 24 899 has a 3-valved capsule Clarke's No 31,637 of C. trilocularis, has a 4valved capsule, and Hooker and Thomson's sample of that species, from the Panjab, has a 3-valved capsule The capsule is thus variable

Habitat - A common plant "throughout the hotter parts of India" This statement, originally made by Roxburgh, is current in the literature of jute. While it need not necessarily be implied that a plant is wild (eg , indigenous) in the area where it is common, still that is the opinion popular writers have derived from the above carefully worded botanical description. The major portion of all we have learned regarding Corchorus capsularis, during the past century, leads to the opposite con-clusion. There are, however, a few notices of the plant that point either to its being indigenous in Ind a or indicate acclimatisation so successful as to have deceived modern botanists Mr J F Duthie has, for example, favoured the writer with a note to the effect that he found C capsularis on the banks of the Gumpti near Judalpur in what appeared a wild condition A Native of the place gave the plant the name of Harrana a word which has no relation to any of the names given to the Indian species of Corchorus in other parts of the country Mr W A Talbot, in a list of the Kanara plants (Bomb Gas XV 1, 428) states of this species that it is "found on road sides sparingly throughout North Kanara" On the other hand Dr Prain (Officiating Superintendent of the Botanic Gardens) has forwarded to the writer, for personal inspectron every sheet of Corchorus cultivated" has not rain should have had

1848

except perhaps one

by Kurz from the Pegu Yomah, Burma with , however, may be an escape " Kurz himself says of C capsulatis (Contrib Knowledge Burmese Flora p 130) - *Cultivated all over Burma and frequently seen in de-

ith. ıen bot of not eđ ted nly

**1840** 

om no hesitation in prospeciii cii what appeared C decemannouncing the no , been reduced to a native of Bengal olitorius, but o his C deceman-While as to

The Round Fruited Corchorus.

CORCHORUS capsularis

sts nativity. Edgeworth says of the Banda district, N-W Provinces,

JUTE.

1850

wild or

in some

discovered both bin and the control of the Capsulatis does not occur in Madras. DeCandolle, after enumerating all the countries where the plant is cultivated (viz, the Sunda Islands, Ceylon, India, Southern China, the Philippine Islands, and Southern Asia generally) says "I am not convinced that the species exists in a truly wild state north of Calcutta, although it may perhaps have spread from cultivation and have sown itself here and there" The writer spent many portion of that Presiden

portion of that Presidence either C capsularis or C rather indigenous condit

parts of Western India, but grave doubts may be entertained as to either being natives of Bengal,—the province where they are now mainly cultivated, and where they exist frequently enough as weeds around the cultivated jute fields. The suggestion is offered, that, by experimental cultivation, it might be found possible to produce forms of Corthorus from some of the truly wild species which would closely approximate to C. capsularls and C. olitorias. With the imperfect knowledge we possess of this subject, the writer would be much more willing to admit t for the cultivated jutes,

recent cultivation are the

based on the length of the fruit vessel (round in C. capsularis and elongated in C. olitones) is, to say the least, scarcely worthy of as much "Cognised by the cultivators in distin-

various cultivated forms that yield the A similar distinction in the shape t was made to give origin to certain

an be produced from the seeds of any

mela- nea referable to other fibre.

one by careful cultivation

It is noteworthy that definite Sanskrit names should not exist for these most useful plants, while other plants of far less value have assigned to them names so precise as to distinguish their varieties, to separate their wild from their cultivated forms, and to indicate every possible structural peculiarity. There are neither Arabic nor Persian names for the species of Corchorus, known to the people of India, and the greatest uncertainty exists regarding one or two Sanskrit synonyms that have been assigned to the jute-yielding species. Indeed, it seems highly probable

٠.

# ORCHORUS capsularis.

### The Round Fruited Corchorus.

JUTE.

urged that when Roxburgh was told that the plant grown in the Botanic Garden was jute, there were in all probability no such dealings in the fibre between Calcutta and Eastern Bengal. Besides, Mr. Kerr rejects that jute is in no way a waste, be implied by the word nehwould simply be that it was in and a drawn from the cocoons-the waste ch in India is made into chasam-but as Mr. Kerr puts it, "an offal mate-

1852

It must be admitted that the long golden bands of jute fibre bear a close resemblance to the ribbands of waste silk or chasam, and that there are many much more 1 ** 5 ...

he word nt, jhot, pointed s under and that, therefore, the name jute given by Roxburgh, the first European writer who used that name, was in all probability a softened form of thot,

a word which may be admitted to have come from the Sanskrit fluta, ord to have prevailed all unless the plant. over Q to have been given to The

C. olitorius and kálasáka to C. caps devoted to the Materia Medica of the knit medical works, he only gives the

a cave they refer, any

1853

some form or other, In its early usage it simply means a " to silk, although

ed as patta-jam thus relieving th

tha, if it be the root from e, has been derived, noor that fibre, nor indeed ne edible property of jute

one nought than a . .

**2854** 

and not to the fibre Among the early synonyms for patha may be mentioned that of Raya ring, the large or noble sana, kakkhala patraka, "the rough leaved," and sann, the sunn-like-names which would suggest large production. a later introduction than Crotalaria juncea to which patta is compared. This idea receives further support from the fact that while sana occurs in the most ancient Sanskeit works, patta appears in the comparatively recent In one of the references to patta, it is spoken of as the chimi (probably a misspelling for China) pdf, a fact which would point to the cultivated jure plant having come to India from China. Mr. Hem

#### The Tufted Corchorus.

CORCHORUS fascicularis.

Chunder Kerr reviews all the reports and early books of travel that refer to fibre or to repe-making in India, and finds that in none of these publications does there occur any mention of the word jute until 1796. In several works 16t is, however, mentioned as a fibre viewed in India as a form of hemp, but which by the home authors was pronounced to be more nearly allied to fix. By the beginning of the present century the word

the new completely a command by 2 to 2 all normation of commenced of

the cultivation of the plant has been introduced from some other country and most probably subsequent to the date of even the most recent Sans-

Lastern Bengal, especially on the islands and lowlying lands of the C itorius, on the other hand, occurs stern side of the Hooghly river, and in Western and Southern

India.

Although there are numerous references to Patta, Tátá, &c., in early

tion is fixed at 1872, in another at 1865, in a third before the date of the

Jute. (Conf. with C. olitorius in a further page.)
Fibre.—See a further page, and also Jute.
Medicine.—The leaves dead are used and

Medicine.—The leaves deed are and are breakfast-ti administere Oil.—".

lighting purposes" (Ramshunker Sen, Agri. Gaz., 163).

Corchorus fascicularis, Lam. ; Fl. Br. Ind., I., 398.

Vern.—Hirankhori, bhauphali, Bomb.; Jangli or ban-pdt, bli nalita, Beng.

vapautts is also given to C. Antichorus.

References -Roxb, Fl. Ind , Ed. C. B. C., 429; Dymock, Mat. Med. W. Ind , 2nd Ed , 115.

Botanic Diagnosis.—Capsules small (1-1 inch) almost cylindrical, very hairy, beak 3-4, splitting with the dehiscence of the capsule. Seedstriangular or diamond shaped, more pointed at the lower end and very similar to those of C. Olitorius but smaller.

FIBRE. 1855 MEDICINE. 1856 OIL 1857

r858

# CORCHORUS capsularis.

## The Round Fruited Corchorus.

JUTE.

urged that when Roxburgh was told that the plant grown in the Botanic Garden was jute, there were in all probability no such dealings in the fibre between Calcutta and Eastern Bengal. Besides, Mr Kerr rejects that jute is in no way a waste, be implied by the word uch-

would simply be that it was in

1852

1853

appearance like the first few threads drawn from the cocoons-the waste known in Europe as "ort" and which in India is made into chisam-but was not itself necessarily a waste, or as Mr. Kerr puts it, "an offal material like ort," It must be admitted that the long golden bands of jute fibre bear a close resemblance to the ribbands of waste silk or chasam, and 11/4.

there on the other hand, the word Balasore, and thout, thot, issa. It has been pointed il Botanic Gardens under

nt day natives of Ocissa, and that, therefore, the name jute given by Roxburgh, the first European writer who used that name, was in all probability a softened form of jlot, a word which may be admitted to have come from the Sanskrit shuta, and in he e prevailed all

> ocen given to Jutt's work is ed from Sans+ By up, at a fee It's narch t

olitorias.

properties as kno ot alludes to this species but makes no mention of C. cap-

the leaves of such a sugary last one Patte to Jute and mention of C. capand medicin was pringing last one Patte to Jute 
names, does not suppose the first European writer who assigned to this 
names, does not suppose the first European writer who assigned to this 
of Cores, allowing the suppose the first European writer who assigned to the 
formation authors, the word does not appear to be in use in left at 
the *present day, at least not in findusting proper. The Sankeit names given 
dahore have already been commented on under C. capsulatis. Me Home 
the suppose the suppose the commented on under C. capsulatis. Chunder Kerr points out that the word blungs (given by various authors

as a llengal name for this plant) is not employed at the present day it is derived from the Sanskilt bhangs (Cannable sativa), and this recalls in a remarkable way Rumphius' name for jute, gunja or gania (may not gunny in . I it have come from the same source?) In ever رقي ووريس . I gate is mixed up with that 1.0 ........ ... that it may be an intro lucal ie ther of hemp or sunn-hemp -weare, Alastie Stat Int. II .

". Not Ditt. 513; Sa's. 1. Mid Met Hint . 111 ; Marroy 13 to Urare, Sind est Benson, Sausaget caper cains Man, est DeCanklie, Origin Cult Pt. 131

Botanic Diagnosis -Glabrous, except the upper half the penole, and the primary veins on the under surface, where worlly have occur; nersyles tearsverie, nearly parallel, peruc d, an Language ming Captule very long and glatrous, brak sira the, remains of the flower firm ng a thick mar. Seeds somewhat triging lar, pointed at bieh extrem terbut mark more so to the h lam, surface often southered, so us to appear 21 15 m = 2014 \$2 7.

Chunder Kerr reviews all the reports and early books of travel that refer to fibre or to rope-making in India, and finds that in none of these publications does there occur any mention of the word jute until 1766. In several works 2at is, however, mentioned as a fibre viewed in India as a form of hemp, but which by the home authors was pronounced to be more nearly allied to flav By the beginning of the present century the word 4st was completely superseded by tute in all commercial correspondence.

JIITE.

the cultivation of the plant has been introduced from some other country and most probably subsequent to the date of even the most recent Sanskitt works. If a modern development, we can scarcely admit that the

Eastern Bengal, especially on the islands and lonlying lands of the Meghna and Brahmaputra Rivers. C. olitorius, on the other hand, occurs chiefly on the lowlying lands on the western side of the Hooghly river, more especially in the Burdwan district and in Western and Southern India.

Although there are numerous references to Patta, 74td, &c., in early Indian writings, enough has been said to show that the greatest cution is necessary in founding too strong convictions that these names allude to the Paragraph of the paragrap

FIBRE. 1855 DICINE.

Horticultural Society of Madras submitted in 1872, a report on the jute cultivition and manufactures of that Presidency, but in the following year wrote and informed Government that they had now discovered that the plant that yielded the so-called jute of their former communication was repreced of Creatlana and not of Corpoteoras. Rosburgh points out in the Flora Indice that there is a wild form of the plant known in Bengal as handful or wild full which has reddish terms. In his Herital Engalemin, he speaks of two varieties of C. oldones, a green form (the fdi) and a reddish (the lantful). This opinion is accepted by Ainslie and by

r63r

Jew's Mallow

JUTE

O Shaughnessy, both of whom call the green variety C offtonus and the reddish C capsularis. The term ban or jangli pat is, honever, at the present day, applied in Bengal to C fascicularis a distinct species from either of the above. Stewart remarks that C offtonus is found wild in the Panjah, but he does not give its Panjah Inames, while he says it is the ban pat of Bengil, a circumstance that would seem to justify the inference that Stewarts wild C offtonus should be corrected into C fascicularis, the more so since that species is indoubtedly wild in the Panjah, although not alluded to by Stewart (For another error committed by Stewart set the remarks under C actuangulus). At the same time the writer, on looking over the Sahautingur Herbarium collections rectly named C officious which was

436), and on which the note occurs,

already remarked, does not, however, possess a sample of Corchous olitorn.

If,

we

1865

still be

thas a truly wild form and not a product of cultivation (possibly from C acutangulus and C trilocularis) escaped and assumed a semi wild condition, then it might almost be safe to believe that it was the prient of all the cultivated forms of jute. In the writer so prinon however, its claim to being viewed as indigenous rests at present on doubtful evidence, but it may at least be confidently asserted that it is not wild in the districts where it is now or ever has been known to be cultivated for its fibre Indeed, there is a strong probabil is that as a cultivated plant C capsularis came to India from China or Cochin China, and that C olitorius may have been produced in Ind a. Its extensive use as a pot herb might explain its acclimatisation over so extensive an area is his been indicated but more can certainly be said in favour of a possible Indian origin for olitorius than for capsularis. The latter would appear to have been cultivated in China before the date of its having been authent cally known to the people of India. It

to the people of India. It hood of Canton for many Or man Mr Hem Chur

this name to the Sanskrit au ma signifying flixen. It is not all to capsularis Ramidijima or Chinese hemp. But in the same wiy to all to capsularis Ramidijima or Chinese hemp. But in the same wiy to all to make the same with t

mallous, and probably concultivated and used as a that C obtorns has for cerherb, hence, says Rauwol have translated Maure de

C. 1866

1866

#### or Edible Corchorus

# CORCHORUS

Mallow. It began apparently to be cultivated in Egypt about the beginning of the Christian era. It is there known by an Arabic name mielosch, a word which seems in Crete to pass into maulchia (Conf DeCandolle). It will at once be seen that these Arabic names (if indeed they be Arabic) bear no relation to the vernacular synonyms given even by the Muhammadans of India (still less the Hindius) to any form of Corchorus. This fact would point to the Muhammadans not hawing known it by its Arabic names prior to or during their successive invasions of India, which were continued for a thousand years from the 7th century. In consequence of this long period of Muhammadan influence, India obtained the Persan at animals, but there being no na forms in such the 1th years of

JUTE.

т867

And, indeed, the paucity of vernacular names for the various forms of Corchorus is perhaps one of the most striking evidences of the knowledge of the properties of these plants being of a comparatively modern date

oa-nut,—or for

degree of im-

the spirit of caution indicated as necessary before too sweeping conclusions are derived from the accidental observations of certain writers who have asserted that both forms of the jute plant are natives of Bengal, because they are plentiful weeds in cultivated situations (Conf. with C. capsa-

is)
Fibre —See a further page and under lute

Medicine.—Alnsile says that Dr. Francis Hamilton (the Buchananhamilton of later writers) had brought to him, while in Behar, specimens of this plant as an herb used medicinally by the Hindus. "Fresh or dry after being toasted and reduced to ashes it is mixed with a little honey, and given daily in peta; (obstructions of the abdominal viscera)" FIBRE. 1868 MEDICINE. 1860

obstructions "

Dr. K. L. Dé, O'I E., says: "The dired leaves of this plant are sold in the market. A cold infusion is used as a bitter tonic, and is devoid of any stimulating property. Mr. Simon of Assam informs me that it can be safely given to patients recovering from acute disentery to restore the appetite, and improve the strength. Six grains of the powder, combined with an equal quantity of Curcuma longa, has been used, in several instances, with much success, in acute dysentery. It forms a cheap domestic medicine in a Hindu household." Dr. Bidde alludes to the dried plant being used in South India as a demulcent.

Food -Throughout India this plant is more or less enlitivated as a pot-herb, although chiefly so in Eastern Bengal. The Santals have a

F00D 1871

1870

544	Dictionary of the Economic
CORCHOI trilocula	
JUTE.	peculiar form which may prove an undescribed species; it is known them as a useful pot-herb under a name most probably derived thence of some importance.
DOMESTIC 1872	Torchorus.  I of the fibre, are used for making gun-powder charcoal, and are also employed in the manufacture of baskets, &c.
1873	Corchorus tridens, Linn., Fl. Br. Ind., I., 398.  """ for more nearly related to the next species larger and raphe-like cord more distinct with glandular hairs in tuits.  Itsh India says of this species: "Generally
FIBRE 1874 1875	Fibre.—Murray specially mentions this species as affording a cordage fibre in Sind.  C. trilocularis, Linn.; Fl. Br. Ind., I., 397.
10,5	Veru — Kuruchunta, Boun ; the seeds are in the basars sold under the name of Khayira, Kaunti, Sans; Indadassir, Kan (according to Lisboa); the aceds are known an Isburd in Sind (according to Murray)  Reference, — Dymock, Mat Med. W Ind, 2nd Ed., 115  Botanic Diagnosis, — Stems, petioles, and under-surfaces of the leaves hurry (as in C acutangulus), but upper surface often almost quite glabrous. Capsule long thin straight angled, beak straight, hairs on the fruit short.
1876	ascending tilled, 3-6 spreading from a thickened gland which is often persistent on the old fruits. Seeds black, smooth irregularly square on section, obliquely and sharply truncate at both extremities, hilam large with a raphe-like cord thrown from it to the top of the seed cossing an editional state of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds of the seeds, the species C untractional state of the seeds of the
FIBRE 1877 MEDICINE, 1878	Prook of the Rompay the seems of the live ?, grains in fever and us was known to the

1878

Greeks. Theophrastus says όπαροιμιαζομένος σια την πικρότητα κόρ-

20095 (H. P., 72). Pliny (21, 32, and 25, 13) also mentions it as a poor kind of pulse growing wild." Murray states that "the plant macerated in water for a few hours yields a mucilage which is prescribed as a

The Commercial Fibre

CORCHORUS.

demulcent, and the seeds as a specific in theumatism." (Pl. and Drugs. Send. 65 1

JUYE.

The Ulfas Udmineh, by Noured-din Mahomed Abdulla Sherazi, uses the name of isbund for a species of what appears to be mustard seed.

JUTE. 1870

TUTE.

In connection with the reports of the Calcutta International Exhibition the writer published the greater portion of the facts which will be found

historic sketch of the subject together with certain facts of economic interest ! connected with the species of Corchorus. It may here be stated that the

Comm. and Vern. Names .- Jule, or Jew's Mallow, E.G.; Jule, maure des juifs, cordetextile, IR.; Jute, GERM ; Pat, Beng. Roxburgh says that "the Dancel e sett "" t . D - 'lo . . . . . • Folanation of chots, the Orissa, this toxburgh

References .- Hem Chunder Kerr's Report on Jute and other Fibres in Bengal, 1877; Babu Ram Comal San Tana Man Was San Report on the fibres by Cross, for the fibres by Cross, find, Ed. C. B.

Etc., and to the Corchorus

HISTORY OF THE JUTE INDUSTRY.

The history of the modern Jute industry is exceedingly interesting and intimately associated with the British rule in India There can be no doubt that jute was known to the people of India from compaHISTORY. 1880

CORCHORUS trilocularis.

## The Tuftedly hairy Corchorus.

JUTE.

peculiar form which may prove an undescribed species; it is known to them as a useful pot-herb under the name of bir-narcha (Rev A. Cambbe'l). a name most probably derived from the Bengali narchá (C. capsularis). hence of some importance knowledge of the plant wa anciently possessed by this F

of baskets, &c.

his Economic Products gives e is send a prostation prosone for cad by the people of the N -W. Pro-

DOMESTIC 1872

ies of Corchorus. emoval of the fibre, are used for making gun-powder charcoal, and are also employed in the manufacture

1873

Corchorus tridens, Linn.; Fl. Br. Ind , I., 398.

Botanic Diagnosis.—Much more nearly related to the next species than to C. acutangulus. Seed larger and raphe-like cord more distinct than in C. trilocularis, capsule with glandular hairs in tults

Habitat.—The Flora of British India says of this species: "Generally distributed" Fibre. - Murray specially mentions this species as affording a cordage

FIBRE 1874 1875

fibre in Sind. C. trilocularis, Linn.; Fl. Br. Ind , I., 397.

Vern -Kura chunts, BOMB; the seeds are in the bazars sold under the name of Raja-jira, Kaunts, SANS, Tandasser, han (according to Lisboa); the seeds are known as Isbund in Sind (according to Murray)

Reference .- Dymock, Mat Med. W. Ind , 2nd Ed , 115 Botanic Diagnosis .- Stems, petioles, and under-surfaces of the leaves

1876

section obliquely and sharply truncate at both extremities, mum target with the

trilor

the

absence of a short style or of a spreading stigling, as no marrow in a conditions on the same plant. The fruits of the species of Corchorus are

more variable than any other part of these plants

Habitat. - The Flora of British India states that this species is met L. Dan ah, Sind and south to the Nilgiri Bengal, and flowers d in Gujarát, Sholá-· · iat it appears along systs oblong, lanceo-

ed" (Murray).

Medicine - Dymock says: "In Bombay the seeds of C. trilocularis, which are butter, are administered in doses of about 80 grains in fever and obstructions of the abdominal viscera. A bitter Corchorus was known to the Greeks. Theophrastus says όπαροιμιαζόμενος διά την πικρότητα κύρ-2025; (H. P., 77) Pliny (2t, 32, and 25, 13) also mentions it as a poor kind of pulse growing wild." Murray states that "the plant macerated in water for a few fours yields a mucilage which is prescribed as a

FIBRE 1877 MEDICINE, 1878

The Commercial Fibre.

CORCHORUS JUTE.

> JUTE. 1870

demulcent, and the seeds as a specific in rheumatism." (Pl. and Drugs, Sind, 65.)

The Ulfaz Udwisch, by Noured-din Mahomed Abdulla Sherazi, uses the name of isbund for a species of what appears to be mustard seed.

IUTE.

In connection with the reports of the Calcutta International Exhibition the writer published the greater portion of the facts which will be found in the present account of the fibre obtained from the species of Corchorus In a further volume the commercial aspects of jute will be given (see JUTE). while in the following pages an effort is made to present a general and historic sketch of the subject together with certain facts of economic interest connected with the species of Corchorus. It may here be stated that the commercial fibre lute is obtained from either one or both of the following species of Corchorus, etc., C. capsularis, Linn., grown in Northern, Cen-

Comm. and Vern. Names .- Jute, or Jew's Mallow, Eng.; Jute, maure des juifs, corde textile, FR.; Jule, GERM; Pdt, BENG. Roxburgh says that "the Bengales call it jute," but Royle enters into an explanation of the origin of the word, which he makes out to be a corruption of chots, the name of a coarse cloth formerly made from this fibre. In Orissa, this cloth was called fhut, shoto, shito, from which probably Roxburgh

Indian name for coarse sackcloth, made originally, as it would appear, from Sunn not from Jute. (See para 1793 and 1800, also Crotalaria juncea.)

References,-Hem Chunder Kerr's Report on Jute and other Fibres in Bengal, 1871; Baba Ram Carel Surface and other Fibra
91, Royle, Fibrau Plant
Report on the Jute Traff
Fibrat by Cross, Bravan, &
Ind., S.G. B. C., 450, A1

&c., and to the references Corchorus.

HISTORY OF THE JUTE INDUSTRY.

The history of the modern Jute industry is exceedingly interesting and intimately associated with the British rule in India. There can be no doubt that jute was known to the people of India from compaHISTORY. 1880

## The Jute Fibre

HISTORY.

raticely remote periods, but, as indicated under G. capsularis and C. offtorius, from the confusion which existed down to the present century in the words sum, put of plate, blangs, and homp, A.c., names applied to ertain laditia libres, it is difficult to determine for certain many of the fibre-yielding plants referred to by ancient writers. The probability is that sunn-homp (the fibre of Crotalaria junces) was better and earlier known

and C. capsularls. Prior to that date the Government returns of exports from India mention hemp fibre; this must have been either sunn or jute, since the true hemp fibre has not been cultivated for centures

1881

the present day, for the importa-

tralia, and Egypt, were, or the supply of grain. of rough gunnies were

greedily bought up the might place or comment was a powerful incentive to increased activity, and thus the gunny-bag trade rapidly became a recognised part of the Bengal peasant's work. By and by, however, European machinery began to compete with manual abour, and in due time it gained the day. Jute was exported to Europe for cordage, and ultimately for the manufacture of the bags required in the grain trade. The first commercial mention of the word "jute" is in the customs returns of the exports for 1128, when 36, cet, were sent to Europe. Soon the agriculturist found that his time would be more profitably spent in preparing an extra quantity of fibre, than in manufacturing logs to compete with steam and mechanical appliances; the preparation of fibre specify outstrapped the demand for home manufacture, and a large expectly outstrapped the demand for home manufacture, and a large expectly outstrapped the demand for home manufacture, and a large extra function of the period of the control of the control of the period of the control of the control of the period of the control of the co

Yarn Mills Company "was establishing George Ackland, a large owner of on-official member of the Legislative

were afterwards called the "Isbera Company, Limited" and are now known as the "Wellington Mills" Three years later (1857) the "Borneo Company, Limited," a Company originally established to explore the Island of Borneo, founded the mills now known as the "Baranagore Jute Mills." In 1865-63 the Courripore Jute Factory came into existence Following these factories sprang up rapidly in every direction around Calcutta. In the Trade Returns for

CORCHORUS.

1860-70 the exportation of manufactured jute was 6,441,863 gunny bags manufactured by power and hand looms, and brought into competition with the Dundee bags. This trade developed steadily, and in 1879 80, ten years later, over 55,008,000 gunnies were exported from India relative importance of the export trade in raw jute, as compared with the exports in manufactured jute of all kinds, may be seen by a careful examination of the tables (given in another volume), but the result may be summarised by saying that in 1886-87 the exports of raw jute amounted to £4,869,814, whereas for the same year the entire exports from India of power and hand loom jute manufactures amounted to only £1,140,206 This is of course a comparison between the total exports of raw jute and a portion of the Indian manufactures. In a further page the relative amount of Indian manufactured jute exported as such and the amount used up locally or devoted to the export trade in grain will be found speaking purely of India's foreign trade in jute and jute manufactures it would seem that even with 24 large European factories at work in India, and the hand-looms which still survive, scattered over the country, her raw jute interests are four times as valuable to India as her manufactures A comparison between the exports of Indian "power-loom" as compared with "hand-loom" imanufactures will still further show the extent to which the peasants,

1882

gunny ba pared with exported

£215,078, the latter, £197,071. There were no European factories in India in 1850, so that the market was supplied by the Indian peasant's hand loom Steadily the exports increased, the demand for gunnies calling into existence the Dundee mills, and soon after the Indian factories. Nothing could demonstrate the development of the jute trade more than a careful examination of the exports of raw jute and manufactured jute from 1854 to 1887. During that period 24 factories, larger than the average jute factories of Europe, have come into existence, and have gradually communications.

CULTIVATION AND PREPARATION OF THE FIBRE.

ARBAND EXTENT OF JUTE CULTIVATION—Jute is largely cultivated in the northern and eastern districts of Bengal and to a smaller extent in the central tracts of the province. In Assam it is grown in Goalpara. The area under the crop in these two provinces during 1885cm in the set wo provinces during 1885cm in the set wo provinces during the control of

has from 15,000 to 16,000 acres,

of fibre It has been ascertained in the interest and mainly to Great Britain and the United States of America, the prototion respectively to these countries being 73 to 17 per cent. of the total despatches from India

The following extract from the jute forecast issued by the Agricultural Department of Bengal for 1837 shows the chief districts where the crop is grown and the approximate areas under it, the latter being in acres:—Mymensingh 250,000, Dacca 170,000, Rungpore 167,000, Pubna 150,000,

TION. Area. 1883

## The late Fibre

HISTORY.

ratively remote periods, but, as indicated under C. capsularis and C. olitorius, from the confusion which existed down to the present century in the words sunn, fat or fatts, thanga, and lemp, &c., names applied to cerfrin Indian fibres, it is difficult to determine for certain many of the fibre-yielding plants referred to by ancient writers. The probability is that sunni-temp (the fibre of Crotalaria juncea) was better and earlier known to the ancient Hindus than jute, and that the true hemp (Cannabis satira) was known to them, if not brought to India by their invading and conquering ancestors. It is almost safe to assume that in very remote times sunni, fatta, and bhangi were synonymous and genene terms for fibre and coarse cloth, without much regard to the plant from which the fibre was obtained. If so, about the beginning of the present century, the word fat became fixed and associated with the fibre of Corchorus officinus and C. capsularis. Prior to that date the Government returns of exports from India mention I emp fibre; this must have been either sunn or jute, since the true hemp fibre has not been cultivated for centuries at least, and modern experiments have shown that the plant is not capable eft , 1-1 v . 4 . 4 perminant in the Water a bar a feet and

1881

C. 1881

turalist found remunerative. The resources of the rich plains of India, Burma, and China, and latterly of America, Australia, and Egypt, were, by the British mercantile fleet, made available for the supply of grain. Bags were required for this trade, and thousands of rough gunnies were greedily bought up. The high price obtained was a powerful incentive to increased activity, and thus the gunny-bag trade rapidly became a recognised part of the Bengal peasant's work. By and by, however, European machinery began to compete with manual labour, and in due time it gained the day. Jute was exported to Europe for cordage, and ultimately for the manufacture of the bags required in the grain trade The first commercial mention of the word "jute" is in the customs returns of the exports for 1828, when 364 cwt. were sent to Europe. Soon the agriculturist found that his time would be more profitably spent in preparing an extra quantity of fibre, than in manufacturing bags to compete with steam and mechanical appliances; the preparation of fibre speedily outstripped the demand for home manufacture, and a large export trade was established in raw jute to feed the Scotch mills. Thus transferred from its original home, the gunny trade took a new start in Dundee, and down to the year 1854 little or no effort was made to im---- -- of E -onean machinery " was establishlarge owner of coffee plantations in Ceylon, and non-official member of the Legislative Council of that Island: these mills were afterwards called the "Ishera Company, Limited," and are now known as the "Wellington Mills" a. Company founded the mills 1-61 the Gourspore ictories sprang up rapidly in every direction around Calcutta. In the Trade Returns for

## The Jute Fibre

HISTORY.

ratively remote periods, but, as indicated under C. capsularis and C. off-torius, from the confusion words sunn, pat or patt.

tain Indian libres, it is fibritally a sunner confusion with the confusion was known to them, if not brought to India by their invading and conquering ancestors. It is almost safe to assume that in very remote times

1881

first as a luxury, and fatterly as a necessity. Jute probably met this demand, and, indeed, the poorer people, luttle more than half a century ago, were largely clad in jute cloth of home manufacture, such as, at the present day, is used by the aboriginal tribes. The increased facilities for the importation of cheap European piece-goods checked, however, the development of hands agriculated in the probable branch agriculated in the probable branch agriculated in the probable branch agriculated in the probable branch agriculated by the

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to Europe for cordage, and equired in the grain trade.

The first commercial mention of the word "jute" is in the customs

returns of the exports for 1828, when 36s, owt, were sent to Europe. Soon the agriculturist found that his time would be more profitably spent in preparing an extra quantity of fibre, than in manufacturing bags to compete with steam and mechanical appliances; the preparation of fibre speedily outstripped the demand for home manufacture, and a large export trade was established in raw jute to feed the Scotch mills. The transferred from its original home, the gunny trade took a new start in Dundee, and down to the year 1854 hithe or no effort was made to improve the Indian manufacture by the application of European machinery. In that year, honever, the "Isbera Yarn Mills Company" was established at Ishera near Serampore by Mr. George Arkland, a large owner of coffee plantations in Ceylon, and non-official member of the Legislative Council of that Island; these mills were alterwards called the "Ishera Company, Limited," and are now known as the "Welington Mills."

Jute Factory came into existence. Following these factories sprang up rapidly in every direction around Calcutta. In the Trade Returns for

1869-70 the exportation of manufactured jute was 6,441,863 gunny bags manufactured by power and hand looms, and brought into competition with the Dundee bags. This trade developed steadily, and in 1879-80, ten years later, over 55,008,000 gunnies were exported from India. relative importance of the export trade in raw jute, as compared with the exports in manufactured jute of all kinds, may be seen by a careful -----on in prost or solumnt but the result may be : . . . . . amounted . . . . . . A ... ..... power and hand-loom jute manufactures amounted to only £1,149,296 This is of course a comparison between the total exports of raw jute and a portion of the Indian manufactures. In a further page the relative med and appendigle bearing breef which the jute manufactures have passed out of the hands of the Indian peasants, who alone, little more than 40 years ago, met the demand for gunny bags. This is seen very clearly when the above figures are com-

1882

gunny bags. This is seen very clearly when the above figures are compared with the exports of 1850-51. At that time the value of the gunnies exported was greater than that of the raw jute,—the former being f215,978, the latter, f197,071. There were no European factories in India in 1850, so that the market was supplied by the Indian peasant's hand-loom. Steadily the exports increased, the demand for gunnies calling into existence the Dundee mills, and soon after the Indian factories. Nothing could demonstrate the development of the jute trade

nes, larger tence, and he market, in. While continued ding, and m with the

Dundee and other foreign manufactures.

CULTIVATION AND PREPARATION OF THE FIBRE.

CUITIVA-TION. Area. 1883

AREA AND EXTENT OF JUTE CULTIVATION.—Jute is largely cultivated in the northern and eastern districts of liengal and to a smaller extent in the central tracts of the province. In Assam it is grown in Goalpara. The area under the crop in these two provinces during 1886-88, has been approximately estimated at 1½ million nacres and the outliurn at 20 million maunds. Of this area Assam has from 15,000 to 16,000 acres, with a production of 237,000 maunds of fibre. It has been ascertained that more than half the annual yield of fibre is exported to foreign countries and mainly to Great Britan and the United States of America, the proportion respectively to these countries being 73 to 17 per cent, of the total despatches from India

" the Agricultural where the crop is being in acres (— >, Pubna 130,000,

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## The Jute Fibre.

CULTIVA
TION.

Tipperah 117,000, Furterdore S3,000, Rajihahye 45,000, 21-Parganas 41,000, Diangep et 40,000, Horra 31,000, Nuddea 10,000, Jesiore 30,000, Khinda 30,000, Futerah 21,000, Honghly 10,000, Goslpira 15,000.

In other provinces, jute, it ough occasionally cultivated, is rarely so on account of its fibre, but to a limited extent the mild, acclimated or culti-

#### impossible in Madeas Id&i

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experiments have, however, been mide in order to discover whether the true jute plant could be profitably grown in Southern India. Mr. Benson (in his Saidopet Esperimental Farm Manual and Guide, page 63), gives the result, artiving at the conclusion that, unless some parts of the Northern Division be more suitable, jute cannot be grown in Madras. So in a like manner it has been tried in Bombyy and Burms, with apparently the final serdict that, in these provinces, it cannot be produced at a price to compete with Bengal. The plant can be grown most successfully in Burma, but the cost of labour has proved fatal to any idea of an extensive commercial industry. In 187-273 Mr. Hem Chunder Mr. In the cost of the control of the cost of

Forecasts ions as to eving any

Actual area 1885

(or 13.350,734 cwt.) We thus arrive at the area as 1.43,513,340. the same line of reasoning the annual average for the years 1880 to 1884 would have been 1,120,160 acres, and for the period from 1876 to 1880, 861,671 acres. The year 1876 was the first in which the imports of jute into Calcutta were carefully recorded, and the above figures may therefore be accepted as indicating the expansion of the area under jute in Bengal. As confirmatory of this general conclusion, based on the pub-

^{*}An effort has been made to correct returns in maunds into cwt. as being more little to be understood by European readers; but where this has not been done, the result may be arrived at by the following simple rule: maunds x = cwt.

CORCHORUS.

lished figures of imports into Calcum and Chi-CULTIVAadded that Mr. Finucane (Director of Bengal), in his report of 1886, revi an influential jute merchant, Mr. F

says "This estimate gives the number of bales of raw jute of 400th each exported year by year since 1877-78, to which Mr. Wilson adds the quantity estimated to have been consumed by the jute mills in Bengal,

ussion, * based regis

1836

tration stations, yet closely accord with the estimates above given, and afford confirmation of their substantial accuracy ' The writer is responsible for the italics in the above quotation It is desirable to draw attention to the fact that the record of the jute trade preserved by merchants bears a close approximation to that tabulated by Government from the very extensive and complicated returns of road, river, and railway traffic, the concentration in the ultimate centre thus being seen to preserve a distinct relation to the far reaching ramifications of the stream But Mr Finucane concludes his review of Mr Wilson's figures as follows - If the annual average of the eight years ending 1884-85 be taken into consideration, the difference between the two sets of figures is not considerable, the estimate worked out in this office from the data above described being only 3 97 per cent less than that of Mr Wilson "

Soil - Jute seems to be capable of cultivation on almost any kind of

Soll

1887

upon submerged lands, and may be said to luxuriate in the salt impreg nated soil of the Sunderbans

Climate. - A hot, damp climate, in which there is not too much actual rain, especially in the early part of the season, is the most advantageous, in exceptionally dry seasons one frequently finds crops standing through the cold season which the cultivator did not regard as worth cutting

Climate 1888

down Preparation of Soil -It may be stated that, when the crop is to be raised on low lands, where there is danger of early flooding, ploughing commences earlier than upon the higher lands. The more clay in the soil, the more free reparation thus commences pruary or March, the soil the clods are broken and weeds are

Preparatio oi Soil 188g

collected, dried, and burned Seed .- No special attention is paid to the selection of good seeds, nor do the cultivators buy and sell their seeds. In the corner of the field a few plants are left to ripen into seed, and these are, next year, sown I he sowings, according to the position and nature of the soil,

Seed 1800

commence about the middle of March and extend to the end of June Harvest.-The time for reaping the crop depends entirely upon the date of sowing, the season commences, with the earliest crop, about the end of June, and extends to the beginning of October.

Harvest. 1891

550

## CORCHORUS

## The Jute Fibre

The crop is considered to be in season whenever the flowers appear, and past season, with the fruits. The fibre from plants that have not flowered is weaker than from those in fruit, the latter is coarser and wanting in gloss, though stronger. It is late reaping that is chiefly accountable for

Crop. 1802

· per acre is a little over 15 maunds. ing as high as 30 to 36 in some districts and as low as 3, 6, or 9 in others, and it is also very dependent

Retting 1803

thinking that, if the drying of the leaves by stacking does not prevent the

discoloration of the fibre, the fibre itself is likely to be benefited by the process, since it is found to separate more readily from the stems, and is thereby saved from the dan districts the bundles of 10

mon practice seems to be

in Bengal.

The period of retting depends upon the nature of the water, the kind of fibre, and condition of the atmosphere. It varies from two to twentyfive days. The operator has therefore to visit the tank daily, and ascertain, by means of his nail, if the fibre has begun to separate from the This period must not be exceeded, otherwise the fibre becomes rotten and almost useless for commercial purposes. The bundles are made to sink in the water by placing on the top of them sods and mud. When the proper stage has been reached, the retting is ripidly completed. The cultivator, standing up to the waist in the fætid water, proceeds "to remove small portions of the bark from the ends next the roots, and, grasping them together, he strips off the whole with a little management from end to end without breaking either stem or fibre. Having brought meanward center he next proceeds to wash

Extraction by dachinery 1891

It is to be leared, however, that muchinery will, iou

15 15

ODG STAILE ILEQUES BUILD E. W. the stem, and the fresher the stem, the more easily is the bark separated.

CORCHORUS.

Mr. W. Oogswell, however, who is an undoubted authority on all questions connected with jute, expressed in December 1831 his opinion that a softer fibre was obtained by the old process (vide A.H. Society's Proceedings. December 1881).

## PROPERTIES OF JUTE FIBRE.

PROPERTIES OF JUTE. 1895

Chemical and Microscopic.—" The fibre, as found in commerce, consists of the fibre-bundles separated from the cortical parenchyma. The bundles contain 6 to 20 fibres. The fibres are firmly coherent in the bundle, the cohesion taking the form of fusion of contiguous walls, the line of fusion being very apparent. The ultimate fibres are of the normal fusiform type, 15—3 mm in length. In section they are seen to be intick-walled and polygonal Reactions, characteristic of the pute-allied group of fibres, are brown with iodine, deep yellow with aniline sulphate; purple with phioroglucia and hydrocloric acid; a strong affinity for the basic colouring matters. Microscopic features. Concen-

Mercerised. 1896

> Cellulos. 1807

777; Calotropis 705, Abstilon 750 and Agare 75%, and Iollons alter-Abroma 800, Rhea 803, Flax 819, Sida 831, Grotalaria 830, Marsdena 883 and Gurardima (Nilgiri nettle) 890 Jute possesses 7600 per cent, and is thus in point of cellulose about the eighth most valuable fiber in India It is notworthy that of the fibres enumerated—Abstilon, Urens, Abroma, Sida, and Jute are obtained from closely aliendiants and yield very similar fibres. But of these jute is the next to the last in point of chemical ment, Sida being the first of the stries. This is a fact of the greatest unportance, when it is added that the experts who examined these fibres at the Colonial and Indian Exhibition pronounced Sida by a long way superport to jute, being finer in point of fibre, possess-

Jute contains 10'3 per cent of moisture and leaves 1'1 of ash; by hydrolysis or bo hing for (a) 5 minutes, in a solution of caustic soda (1 per

Ash. 1803

finer and softer in texture. By privation jule gains in weight, becoming 138, being in this respect inferior to any of its aut of force, but it is found to contain all precions of carbon having the highest amount of any remoded Indian flore; Sida, for example, possesses 45°2, flax 43°0, and Banhina flore only 47°1.

#### The Jute Fibre

PROPERTIES OF JUTE

The results of the chemical and microscopic investigation of jute, instituted by Messrs. Cross, Beavan, and King, may be briefly stated to

Strangth. 1800

be that much more might be made of jute than has as vet been accomplished, especially in the direction of altering chemically its properties and thus adapting it for perfectly new purposes. One sample experimented with was made to resemble tasar-silk so closely that some care was necessary in distinguishing these substances, another looked remarkably like toon 5 s certainly ď

it is less of similar properties with greater strength, as we hope to be able to show among the mallow and other nearly allied tribes of plants." This opinion has been fully confirmed above by the results of Messrs Oross and Beavan

the recent report of experiments with Bengal fibres issued by the Agri-Horticultural Society of

ot be forgotten that jute has been cultivated for centuries, that it is in consequence more amenable

neralise returns might easily be obtained since tieff and affect of opinions as to the superiority of Sida over jute for the finer textile Roxburgh found in his comparative tests of the fores of purposes Roxburgh found in his comparative tests of the local lind a that a "dry line" of Corchorus capsularis broke with a neight of this and a "wet line" with the same weight, whereas Corchorus o'itomas gave may with 113 and 125th respectively, the wet line finning 11th in weight. This fact of the superiority of the fibre of capsularis over o'monus is well known in modern commerce. To compare with these results it may be mentioned that, un ler the same test, a "dry" and a "wet" line of sunn-temp broke with took and z 47, respectively, the latter gazing 31h inweigh. Tessing jute in another was by micerating in mater 1 x 116 days, white, tanned, and tarred I not, Rosburgh 1 and Corchorus o romas where and fresh, to break with ( 12 after maceralu n, t. give way with 402; C capen'aris 6; Band 5: 5 Very li tle d ff-rence was etherred in the tannel ropes, but the turned seemed to presente the e strength come legably, the I ne fresh and targed trake with 18, and after era erat nif e 116 dass bere a weight of to L

The defect of late is the differ to to up a the I gher courts go being store the time multi-commercially and when manufactured the file of late well in 1 mg as it is received and to a damp influence, but the taget , when damp and expend to the armorphore.

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1900

## CORCHORUS.

## PRICE OF CHITIVATION.

No trustworthy figures are available of the prime cost to the cultivators of raising and extracting a maund of jute fibre But the follow-

PRICE OF CULTIVA-TION. 1902

	ualities	1873-80	1880-81.	1881-82	1882-83
Narainganj	Fine Medium Common	F a p 5 2 9 4 9 6 4 0 9	R a. f 5 0 3 4 6 9 3 13 7	R a p 4 15 10 4 3 4 3 10 4	R a. p 3 7 6 2 15 2 2 7 6
Serajganj	Fine Medium Common.	5 4 0 411 0 4 2 0	5 2 0 4 8 0 3 15 0	5 1 0 4 4 0 112 0	3 9 0

The average prices for the last four years were as follows -

					Dengaa	rasam
					Rap	Rap
1883-84					3 12 0	4 0 0
1884 85					3 4 0	2 13 0
1835-86		-	•		3 4 0	3 1 0
1886-87					3 10 0	320

D----1

A ---

Naraingani | Seraigani

The charges per maund incurred from the time the jute is purchased from the producer to the time it is landed in Calcutta are approximately as follows.

											<u>.</u>		,,,	
Freight to Calcut	ta.								R o	a 8	þ	₽ o	8	p
Drumming, ship	ping,	&c		•	•				0	2	0	0	2	0
Aratdari .							•		0	2	0	0	2	0
Bepari s profit	•	•	•	•	•	•	•	•	0	5	o	0	5	0
						То	TAL	_	•	1	0	3	1	•

Deducting the charges just shown from the cost of the jute landed in Calcutta, will give the rates paid to the grower, thus —

Qualities	1879-So	1880-S1	1881-82	1882-83
Nara nganj . {Fine Med um . Common	F a. f	R a. p	R a p	R a p
	4 1 9	3 15 3	31410	2 6 6
	3 8 6	3 5 9	3 2 4	1 14 2
	2 15 9	2 12 9	2 9 4	1 6 6
	4 3 0	4 1 0	4 0 0	2 8 0
	3 10 0	3 7 0	3 3 0	2 0 0
	3 1 0	2 14 0	2 11 0	1 8 0

The prime cost to the cultivators must be something lower than the figures shown in this last statement, and assuming that the data fur-

## The Jute Fibre

PRICE OF CULTIVA-

nished are near the truth, if not correct, they lead to the following important inferences, vir. (a) that the price of jute has declined considerably during the past few years, and (6) that while the profits of the middle men have not varied, those of the growers have fallen proportionately with the fall of prices in Calcutta. The price of jute fluctuates very considerably; a good year induces an indiscriminate extension of the area which must of course be attended the following year by a fall in price,

R8 a maund. as a maund. in ordinary years they are "L ten earn as much as 10 to season, In the murai Department, "The trade statistics of the year have shown that the importation of raw jute to Calcutta from all sources was practically the same as in the previous year; while the value of the exports from Chittagong was twenty-seven lakks more than that of the previous year. It thus appears that the crop was a larger are he er, to the lowness of were on an average

1903

For this reason a right area than to be seen sown this season, save in limited tracts which had suffered from floods in the two previous years. The prospects of the crop were generally excellent to the end of May, when the young plants were seriously damaged by floods which accompanied the cyclone, especially in the districts of Rungpore, Rightshitye, Dinagepore, Bogra, Julpigoree, and parts of Hooghly. These localities, however, excepting Rungpore, are not of first-rate importance.

at present, it may be said that it above that of last year, and area sown is above the feet of last year, and area sown is above the normal. Toods in some districts will be said to the said of the said that it is a said to the said that it is a said to the said that it is a said to the said that it is a said to the said that it is a said to the said that it is a said to the said that it is a said to the said that it is a s

Average whole- Average declared

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						select		intracts		m l		
					1	2		p.	4	a	,	
15-6-77					- 1	3	•	•	4	4	e	
1777-75				-	- 1	. 3	۰		4	13	۰	
18 1-1-2						- 4	•	o	4	to	•	
45-24,					•	4	10	f.	4	13	æ	
11 >11						4	8	•	- 4	14	ø	
124141				-	•	4	8	ø	4	**	0	
254 -47						3	3	ø			0	
1 1 1 1				•		3	12	•	4	11	•	
131415			-	•	• ;	ž	4	•	4	•	•	

CORCHORUS.

#### COMMERCIAL VARIETIES.

COMMERCIAL VARIETIES. 1904

There are several well-known commercial varieties of jute fibre, of

order, those of importance being marked *.

1. Bakrabad.—A beautiful soft fibre, one of the finest qualities from the Dacca district, being raised on the churs of the Megna river.

2. Bhatial.—A coarse strong fibre, chiefly exported to Europe for rope south

and Faridpur,

. * Desi (in commerce Daissee) - This is a useful and good fibre, largely used for gunnies, it is long, soft, and fine, but it has a

bad colour and is pronounced "fuzzy." It is produced in the

Seraj-

marshes
(b) Charna Deswal, or fibre from the crop grown on churs.

 Jangipurt.—A poor fibre, short, weak, and more suited for paper manufacture than for spinning. It comes from the Pubna district.

7 Karimgani.—A fairly good fibre, very long, and of good colour. It comes from the Mymensingh district, taking its name from a small village.

 Mirganji —Generally an inferior fibre, the worst kind coming from Mirganj, a village on the Teesta The fibre generally comes

20 *!- ,

II. **

These 11 qualities, and others of minor importance, are in commerce generally grouped under four leading classes represented by the Seray-gent, Maraingunt, Desi, and Deora; and these, again, are classed as "Fine," "Medium," and "Common," according to the qualities of the fibres. Mr. James Duffes, in a letter addressed to the writer, says of this

1905

ils or

## The lute Fibre

PRICE OF CULTIVA-TION,

nished are near the truth, if not correct, they lead to the following important inferences, vis. (a) that the price of jute has declined considerably during the past few years, and (b) that while the profits of the middlemen have not varied, those of the growers have fallen proportionately with the fall of prices in Calcutta. The price of jute fluctuates very con-- m nate extension of the area r by a fall in price, undue contraction R3 to R8 a maund

a annas a maund. On the other ha n ordinary and, in consequi olten earn vears they are ing season, Scarcies 4 as much as to to 12 annas a day produces a bad cr forecast for 1837, to- atten thes great damage in the

Government of Ir tics of the year

from all sources was practically the same as .

the value of the exports from Chittagong was twenty-seven lakes much of the nervious year. It thus appears that the crop was a larger houses to the lowness of an average

1003

I this serson, For this reason a larger aich save in limited tracts which had suffered from floods in the two previous years The prospects of the crop were generally excellent to the end of May, when the young plants were seriously damaged by floods which accompanied the cyclone, especially in the districts of Rungpore, Rafshahye, Dinagepore, Bogra, Julpigoree, and parts of Hooghly These localities, however, excepting Rungpore, are not of first-rate importance

. t - neesent, it may be said that tove that of last year, and, a sown is above the normal, a de in some d'atricte will be . t may be expected that

wever, depend on the reginning of August " distribution o ... . ie's Report (to which

The following table, extracted troth !! frequent reference has been made), shows the average wholesa'e price of jute per maund since 1876, and at the same time gives a key to the viluations returned by the Custom House :-

Average white-tweeze declared sale price in 12 value as per selecte I districts Custom House Katurns. in liangel 18-77 11 13 19 ø 14 1 8 8 12

CORCHORUS. COMMERCIAL VARIETIES.

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## COMMERCIAL VARIETIES.

There are several well-known commercial VARIETIES of jute fibre, of which the following, arranged in the order of their corimercial importance. .... Seralgann. Narain-Jungipuri.

" these in alphabetical order, those of importance being marked *.

I. Bakrabadi. - A beautiful soit fibre, one of the finest qualities from the Dane defent he are for rain a shart per of the birray f. ef. or rope

· south

3. * :>chiefly "e near

Faridpur, where there was formerly a large mart for this variety The name is given to all the jute from Backergani and Faridpur.

4. Desl (in commerce Daissee) -This is a useful and good fibre, largely used for gunnies, it is long, soft, and fine, but it has a bad colour and is pronounced "fuzzy." It is produced in the

5. *

impolarit variety. It comes from the neighbourhood of Serajgani, and is said to consist of two kinds or sub-varieties :-

(a) Bilan Deswal, or fibre from the crop grown over bhils or marshes

(b) Charna Deswal, or fibre from the crop grown on churs.

Jangipurt.—A poor fibre, short, weak, and more suited for paper manufacture than for spinning. It comes from the Pubna

7. Karımganjı.-A fairly good fibre, very long, and of good colour It comes from the Mymensingh district, taking its name from a small village

8. Mirganji -Generally an inferior fibre; the worst kind coming from Mirgani, a village on the Teesta. The fibre generally comes from the Rungpore district

* Narainganji (in commerce Naraingunge) - This is an excellent fibre for spinning, being long and soft It comes from the Dacca district, and is exported to Calcutta from the Naraingani marts,

10 * Sera ganii (in commore Cor- - -- 1 .D- 1

ıı. ** :'··

it receives its name on account of its coming from the northern portions of Seraigani and that neighbourhood. The following are the localities from which it is obtained . Rungpore, Goalpara, Bogra, parts of Mymensingh, Kuch Behar, and Julpaiguri,

These 11 qualities, and others of minor importance, are in commerce generally grouped under four leading classes represented by the Seraigans, Naraingans, Desi, and Deora, and these, again, are classed as "Fine," "Medium," and "Common," according to the qualities of the fibres. Mr. James Duffus, in a letter addressed to the writer, says of this 1005

## The Jute Fibre

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v,	<b>ARI</b>	Eī	1E	S

subject: "Every small mart in Eastern Bengal has a jute of its own, quite as worthy of mention as many of the minor forms alluded to above." This remark has an interest beyond that of commerce, for we must either infer that this extensive series of qualities of fibre indicates distinct forms

#### FOREIG TRADE 1906

## FOREIGN TRADE IN JUTE AND JUTE MANUFACTURES.

For full particulars of this trade up to date see JUTE in another volume. The present article is intended more as a historic sketch of the jute industry in which an attempt is made to give the main facts of the cultivation of the plant, and of the Indian manufactures.

#### INTERNAL TRADE, IOD7

## INTERNAL AND COASTING TRADE.

Jute" and "Home Consumption out of place here to indicate very see the consumption of place here to indicate very see the consumption out of place here to indicate very see the consumption of place here to indicate very see the consumption of place here to indicate very see the consumption of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption out of place here to indicate very see the consumption of the consumption out of place here to indicate very see the consumption of the consumption of the consumption out of place here to indicate very see the consumption of the consumption

ade will be discussed under the

cwt. Wete conveyed at 166 and cwt. making a total of jute ships cwt. Golonel Conway-Gordon 9,392,813 cwt., of which 3,579,662 cwt. by the Eastern Bengal Rulway; 148 cwt. by the South Eastern State Railway; 356,496 cwt by road; and 5,348 cwt by sea. Thus the Country Boats head the list, carrying to the sea-board 38 is percent, of the total jute supply—the Eastern Bengal Railway carrying 370 per cent., and the Inland Steamers and 20 gper cent. The oals

1908

and from Serajgani 602,468 cwt, while the RAILWAY time.

obje who make it an important that

to the limit, it will be 50,000 who find daily employment in the

For the purpose of allowing of comparison with the returns of foreign trade,
 Colonel Conway-Gordon's figures of maunds have been converted into cwt.

CORCHORUS.

European factories. But even this estimate would leave out of all consideration the indigenous hand looms that are still able to compete with steam in the production of jute cloth, bags, and cordage.

HOME MARKET.

## RAW IUTE.

#### EXPORTATION AND HOME CONSUMPTION.

EXPORTS.

The following abstract of the FARORTS OF RAW JUTF FROM CALcurta will be found interesting as showing the steady and constant increase and development of the jute trade. The mean exportations for

sent but a portion of the jute industry, -namely, the exports :-

Up to						Average of five years, in civt.
1832-33		٠				11,800
1837 38	•					67,483
1842-43		•	•			117,047
1847-48						234,055
1852 53						432,850
18,7-58						710,826
1862-63						969,724
1867-68						2,628,110
1872-73					٠	4,858,162
1877 78						5,362,267
1832-83						7,274,000

The foreign exports of raw jute were, in 1882 83, 10,348,909 cwt valued at R5,84,60 259, since which they have declined considerably, being in 1886-87 only 8,306,708 cwt valued at R4,86,98,146. The exports of 1882-83 were the highest on record

The rapid, yet constant, increase in the jute trade, which the above figures show, from 364 cet in 1828 to 10348,090 cut. in 1832-83 representing an increase in value from R620 to R5.84,69,259 in the short period of \$5 years (eg. from £62 to £5,846,935 for exported raw jute alone) speaks volumes for the noble fleet of merchant vessels trading with our Indian ports. Mr Hem Chunder Kerr, in his valuable Report on the Cultivation of, and Trade in, Jute in Bangal, has laid much stress upon the Russan war in 1854,55 as a cause of the development of the jute trade of India. It doubtless was a cause that perhaps on the stress cannot no as compared with the dema

with the internal administrative reforr which, by railway, road, and canal,

the field of European commerce

The figures of Indian trade sho

increased from 1,092,668 cwt in that in 1871 72, it suddenly rose to

5 years has preserved an average of about 7,274,000 cwt

In 1882 83 Indian commercial men calculated that on an average Scotland consumed over 18,400 bales (73,600 cwt) a week Of these Messrs Cox Brothers take 2,200, Messrs Gliroy & Sons, 750; Messrs Malcolm, Ogilwe, & Oo, 650, Mr. John Sharp, 700 In Ingland the weekly consumption is over 1,860 bales, the largest consumers being the Barrow Company, 600 In Ireland the total weekly

1910

IOII

#### The Inte Fibre

#### EXPORTS.

consumption is about 730 bales, the largest firm consuming under 300 bales a week. Thus Great Britain requires over 2,7000 bales or 83,000 cut. a week, or 4,200,000 cut. a year to keep her existing jute factories employed. These figures, when compared with the hand-loom consumption in Bengal, show how completely the gunny trade has passed out of the hands of the Indian peasant. The entire hand-loom consumption of jute in Bengal has been returned as 2,23,000 maunds a 3 ear, but allowing 50,000 maunds more to cover imperfections, this would give an annual consumption of 105,000 cut. The Scotch power-looms alone consume 73,600 cut. a week, or 3,710,000 cut. a year. Although in some respects this estimate has been disturbed, it is relatively correct for the present user (829-88).

1012

sent year 1837-88.

France requires 4,000 bales a week, its largest consumer, Saint Freres, requiring 700 bales; Germany requires 2,170 a week, of which the Brunswick Jute Spinning Company consume 770 bales; Belgium requires 845 bales a week; Austria, 580, 59ain, 250; Holland, 400; Norway, 100. Taking annual figures for the whole of Europe 11 is found that Great Britain and the Continent of Europe require 1,800,000 bales a year, of 4,428,580 cwt. It may be here stated that as merchants adopt the calendar year, and Government the financial, e.g., from April to March, considerable difficulty has been experienced in companing the Government Statistical Tables of Exports with those kindly supplied by one or two well known jute firms in Calcutta.

1913

Comparing with the above figures the 22 Indian factories at work in India in 1882-83, which on an average consumed each 500 bales per week, or 500,000 bales a year, equivalent to 2,142,048 cwt, it would appear that to keep these factories working, about 8,571,428 cut of raw jute that to keep these factories working, about 8,571,428 cut of raw jute and adding to this amount the quantity annually constructed.

nual hese seen nds.

nds, thus showing a very considerable expansion, although the exports of raw to have declined somewhat during the past five years.

Annual Capital. 1914

annual consumption or over 13,000,000 m to be far from correct. This is roughly equivalent to an annual turn over of capital equal to about 12—14 millions of pounds sterling as compared with the exports in 1828 of £62.

MANUPAC-TURES. 1015

# THE MANUFACTURES OF JUTE AND THEIR EXPORTATION FROM INDIA.

In the vicinity up in rapid succe other at Cawnpor also in Dombay cutta. The number of cutta. The number of panies is stated in the returns at 285 takhs, which, at the conventional panies is stated in the returns at 285 takhs, which, at the conventional packbange of to rupees to the pound sterling, would be £,350,000. The others are private factories, but their capital may be put down at 30 to 40 takhs of rupees. These 24 factories have 7,164 tooms and 135,593 spin-

CORCHORUS. MANUFAC-TURES.

dles, and they give employment to 20,660 men, 11,108 women, 5,113 young persons, and 3,044 children. The Madras private jute company , up to the present date, there are in all mployment to 49,015 persons and use re almost exclusively employed in the

doing a small business in cordage.

floor cloth, or other manufactures In 1870 there were in England 12 factories, in Scotland 90, in Ireland 6, in all 117 factories, with 212,676 single and 7,492 double spindles, and 11,288 looms, giving employment in all to 36,354 persons. In India there

are only 24 factories, but these employ 40,015 persons It is difficult to make a reliable comparison without the details of every individual factory Judging from the published statistics of jute factories in Scotland during the year 1879, and comparing a fixed number of these with the Indian factories for the same year, we may, however, conclude that the Indian mill workman was inferior to the Scotch workman in the ratio of 3 to 7. That is to say, it requires 7 persons to work one loom in an Indian factory, against 3 workmen in a Scotch factory. This conclusion is arrived at by dividing the total number of persons employed in a factory by the number of its looms, and obtaining the average for all Scotch factories and the average for all Indian factories. course this calculation is open to the error of the Indian and English factories not manufacturing the same class of goods, but relatively it may be accepted as giving some sort of comparison.

## FORFIGN TRADE IN MANUPACTURES.

Foreign Trade in Manufactures. 1917

1016

Prior to 1857 the exports of Jute manufactures from India represented hand-loom fabrics. In 1850 these were valued at £215 978, whereas the trade in raw jute was only £197,071 Fifteen years later the manufactured jute, exported to foreign countries, was valued at R18,27,083 (f.182,708) and the raw jute at R75,06,690 (£750,669) In 1870-71 the exports were of manufactured jute R34,24,249 (£342,424) worth and of raw jute R2,57,75,526 (£257,755) But the revival R2,57,75,526 (£257,755) But the revival jute indicated by these figures, as also

raw jute trade, was at once the death of t " the birth of the new power-loom

exports of manufactured jute were valued at R1,13,06,716 (£1,130,671), of which the hand-looms produced R2,6953 (£26,053), and last year they were valued at R1,13,18,377, (£1,151,857), of which the hand-looms prower valued at R1,13,18,377, (£1,151,857), of which the hand-looms pro-

market for jute goods,

## LOCAL OR HOME CONSUMPTION.

ocal Con-IOI8

grain or other produce, nor those used for home purposes or sent to other parts of India. These figures do not, therefore, show the whole outturn of gunnies annually manufactured in India. In fact, from January to December 1882, 119,042,771 gunnies were actually made by power-looms, of which only 41,523,607 were exported; so that the exports were barely one-

The lute Fibre

EXPORTS.

consumption is about 730 bales, the largest firm consuming under 307 bales a week. Thus Great Britain requires over 21,000 bales of 81,000 cnt. a week, or 4,200,000 cnt. a year to keep her existing jute factories employed. These figures, when compared with the hand-loom consumption in Bengal, show how completely the gunny trade has passed out of consumption of ear, but allowing a give an annual alone consumers.

spects this estimate has been disturbed, it is relatively correct for the present year 185-88.

1012

France requires 4,000 boles a week, its largest consumer, Saint Frees, requiring 700 boles; Germany requires 2,170 a week, of which the Brunswick Jute Spinning Company consume 700 bales; Belgium requires 845 bales a week, Austria, 580; Spain, 250; Holland, 400; Norway, 100. Taking annual figures for the whole of Europe it is found that Great Britain and the Continent of Europe require; 1,800,000 bales a year, or 6,428,580 cm. It may be here stated that as interchants adopt the calerdar year, and the same period of the calerdary from April to March, considerable different from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the construction of the calerdary from the calerdary from the construction of the calerdary from the calerd

1913

Comparing with the above figures the 22 Indian factories at work in India in 1852-83, which on an average consumed each 500 bales per week, or 600,000 bales a year, equivalent to 2,142,048 cmt. it would appear that to keep these factories working, about 8,571,428 cmt. of raw jute were required; and adding to this amount the quantity annually consumed by America America and the first form year.

were the estimates framed for 1882-83, but in an early page it has been stated that this year's production is probably close on an milion maunds, thus showing a very considerable expansion, although the exports of raw jute have declined somewhit during the past five years.

Annual Capital IGI4 Looking at the exportation of raw jute, of manufactured jute, and the home (Indian) consumption known to our commercial men, these statement that the jute trade is at least represented at the present date by an annual consumption of over 15,000,000 cwt. of raw jute does not seem to be far from correct. This is roughly equivalent to an annual turn over of capital equal to about 12-14 millions of pounds sterling as compared with the exports in 1828 of £62.

MANUFAC-TURES, 1015

# THE MANUFACTURES OF JUTE AND THEIR EXPORTATION FROM INDIA.

In the vicinity of the property CORCHORUS MANUFAC-TURES.

dles, and they give employment to 29,660 men, 11,198 women, 5,113 young persons, and 3,044 children. The Madras private jute company - up to the present date, there are in all · · · · employment to 49,015 persons and use . re almost exclusively employed in the

doing a small business in cordage. In 1879 there were in England 12 factories, in Scotland 99, in Ireland

6. in all 117 factories, with 212,676 single and 7,492 double spindles, and 11,283 looms, giving employment in all to 36,354 persons. In India there are only 21 factories, but these employ 40,015 persons.

It is difficult to make a reliable comparison without the details of every individual factory. Judging from the published statistics of jute

1016

man in the ratio of 3 to 7. That is to say, it requires 7 persons to work one loom in an Indian factory, against 3 workmen in a Scotch factory. This conclusion is arrived at by dividing the total number of persons employed in a factory by the number of its looms, and obtaining the average for all Scotch factories and the average for all Indian factories. Of course this calculation is open to the error of the Indian and English factories not manufacturing the same class of goods; but relatively it may be accepted as giving some sort of comparison.

## FORFIGN TRADE IN MANUPACTURES.

Foreign Trade in Manufac-tures. 1017

Prior to 1857 the exports of Jute manufactures from India represented hand-loom fabrics. In 1850 these were valued at £215,078, whereas the trade in raw jute was only £197,071. Fifteen years later the manufactured jute, exported to foreign countries, was valued at R18,27,983 (£182,798) and the raw jute at R75,06,690 (£750,669). In 1870-71 the exports were of manufactured jute R34,24,29 (£34,24,24) worth and of raw jute R2,57,75,526 (£257,755). But the revival jute indicated by these figures, as also:

raw jute trade, was at once the death of t. the birth of the new power-loom. Ten .

exports of manufactured jute were valued at R1,13,06,716 (£1,130,671), of

which the hand-looms produced R2,69,553 (£26,055), and last year they were valued at duced R80 220 (#

of the Indian por In a further pa market for jute goods.

LOCAL OR HOME CONSUMPTION.

Local Con-IOI8

It should be carefully observed that the returns published by Government show only the exports, properly so called of hales of a-abags, gunny-cloth, or jute rope as such,

of gunnies, &c., which annually leave grain or other produce, nor those used for

parts of India. These figures do not, therefore, show the whole outturn of gunnies annually manufactured in India. In fact, from January to December 1882, 119,042,771 gunnies were actually made by power-looms, of which only 41,523,607 were exported; so that the exports were barely one-

## CORCHORUS.

## The Jute Fibre

MANUFAC-TURES, Home Consumption.

IQIQ

third of the number actually manufactured. The following table will show the relations of the home consumption to the exports more clearly:—

Statement of Home Consumption and Exports of Gunners from 1st January to 31st December 1881.

Burma .			٠					•	13.312,396	
Strate .		٠.	•						9,153,233	
Hombay an	œ	rrai:	an.	Gall					20,001,101	
Madras and	M:	ւհե	41						1,064,545	
Coromandel	Co	ast	٠						3,500,050	
Ceylon .			٠					· ·	177,777	
Up country	bv	rail		_			-		11,351,000	
Used in the	641	110	tra	ام مان	Cal			•	\$1,548,743	
	,						-	•	**** 5/44	
Tot	al c	f H	on	e Co	กรนก	pti	oti		***	77,519,16
Australia								_	11,372,397	
New Jealan	1				- :				5,000,100	
Cape of Goo	d F	loce	٠.						705,308	
Mauritius	-:				- :		:	•	119,018	
							•	•		
I count .										
I gypt .	:		٠	٠	•		•	•	671,078	
America .	:	*1-	: :		:		:	:	20,534,251	
America . Hongkong (	101	He	ssi:	203)	:		:	:	20,534,251 413,700	
America .	101	He	ssi:	2n3)	:		:	:	20,534,251	

Total of Foreign Exports

41,523,607

Grand Total of Home Consumption and Loreign Exports

119,047,771

The total number of gunny-bags brought to, and carried from, Calcutta during the part three years may be here given and alongside of these the foreign exports:—

	1884-85.	1895-86	1586-87.
Imports Total Exports (to other pro-	18,196,002 137,870,318	20,626,541 127,084,964	23,596,402 124,957,22 <b>5</b>
Countries)	82,779,207	63,760,546	64,577,157

1020

total production of gunny-brgs in Bengai was pittled a 150 millions, of which 641 millions were sent to foreign zountres and 854 millions used up in India. This may be accepted as representing the bags employed in the home, cotton, oil seed, rice, and wheat trade, and in the export trade of findia.

nterportal quantity 5,267,418 in to these ver-borne

, ---- to d last a nar to, 707,225 jards

1 14 6-- --

CORCHORUS.

Traffic of Bengal for 1887 states that 605,816 pieces were sent upcountry by river "direct from the jute mils without passing the Port Commissioner's wharves." A piece of power-loom gunny is equal to 80 yards, of hind-down, to 22 yards, 50 that this power-loom trade alone re-

MANUFAC-TURES. Home Consumption.

tolerably clear

## CLASSIFICATION OF THE JUTE MANUFACTURES.

The manufactures from jute or pát may be referred to three primary sections:

I.-CLOTH of different qualities ranging from substitutes for silk

to shirtings, curtains, carpets, and gunnies.

II.—PAPPR chiefly prepared from the "rejections" and "cuttings."
III.—Cordage from the coarser and stronger qualities.

These three sections may each be referred to a number of sub-divisions, which for convenience may be arranged in two leading groups, wis, native and indigenous manufactures, "hand-loom," and European or "power-loom" manufactures, whether made in Europe or in India We shall first enumerate the indigenous manufactures, since these bear on the history of the industry.

## INDIGENOUS MANUFACTURES.

Indigenous Cloth.—Every homestead in Bengal has suspended from a balkin

Indigenous Manufacture. 1922

TION OF MA

1021

of spr poses

Sen, in the Transactions of the Agririce different modes of preparing twine means of a reel, called a dhera, the

second by the takur, and the third by the ghurgurra. The first is said tended

st, Thick cloth used for making gunny bags. Of this there are three qualities, the best being known as amrabati. These correspond to the three qualities of hand-loom gunnies in commerce.

20

## The Jute Fibre

MAYUPAC-TURFS. Home Consumption.

TOTO

thand of the number actually manufactured. The following table will show the relations of the home consumption to the exports more electly:--

Statement of Home Consumption and Esports of Gunning from 1st

		3"	411/11/	y 10,	3111	Ucce	MC17 1831.	
Harma .							23,312,505	
		. •					9,153,233	
Bombay and	3,6	man I	4011				20.1-11.103	
Mailras and	157	abar					1,061,919	
Cotmmatel.	Cna	и.	•		•		3,600,050	
Ceylon .	٠	. •	•				177,777	
Up-country !	Y.	34 .	. •.		•	•	11,351,000	
Used in the c	X IN	st tra	70 of	Calcu	ita.		\$5,949,742	
<b>.</b> .			_				, , .	
Tota	of	Home	: Con	tamp	ion		***	77.519,164
Australia				_			\$1,372,187	77.20.71.04
New Iraland			- 7	-	•	•	5,000,160	
Cape of Good	tr.	`	•	•	•	•	3,000,000	
Cal- or Oron		77.		•	•	•	706,303	
Mauritius							119,078	
Trypt .							691,078	
America .	•	•	•	•	•			
11	٠.			•	•	•	\$0,224,223	
Hongkong (n	1 20	165533	ns)		•	•	413,700	
Great Britain							516.417	

Grand Total of Home Consumption and Loreign Exports 119,042,771

The total number of gunny-bags brought to, and carried from, Calcutta during the past three years may be here given and alongside of these the foreign exports:—

	1554-85.	1885-86.	1886-87.
Imports Total Exports (to other pro- vinces of India and to foreign	18,196,002 137,870,318	20,626,541 127,084,964	23,5% 402 124,957,225
Countries)	82,779,207	63,760,546	64,572,157

1920

The difference between the total exports from Calcutta and the foreign exports approximately represents the home (Indian) consumption, although there is doubtless a balance between the total of production + imports and the exports, which would represent the Calcutta local consumption. This in 1882 was estimated to be over 11 million bags, so that last year the total production of gunny-hags in Bengal was perhaps little short of 150 millions, of which 64½ millions were sent to foreign countries and 85½ millions used up in India. This may be accepted as representing the bags employed in the home, cotton, oil-seed, rice, and wheat trade, and in the export trade of India.

But in addition to gunny-bags India exported last year 12,799,225 yards of gunny-cloth, valued at 80,80,741, and this exclusively of the interportal trade which amounted to 5,728,858 yards (nearly the whole of this quantity going to Bombay), making a total of 18,480,001 yards as agrunst 25,267,418 yards in 1855-80, and 19,023,884 yards in 1854-85. But in addition to these returns of gunny-cloth conveyed by sea, the Report of the River-borne

CORCHORUS.

Traffic of Bengal for 1837 states that 603,846 pieces were sent upcountry by river "direct from the jute mills without passing the Port Commissioner's whares." A piece of power-loom gunny is equal to 80 yards, of hand-loom, to 22 yards, so that this power-loom trade alone reMANUFAC-TURES. Home Consumption.

rking out the

c gunny-bags are given in d to convey a

tolerably clear conception of the extent of the internal trade both in bags and cloth. It may be added, however, that the bulk of the hand-loom industry is conducted in Dinagepore, Purneah, Rungpore, Julpaiguri, and Tipperali, Julpaiguri turned out last year 2,330,660 and Rungpore 1,222,410 hand-loom made bags.

CLASSIFICATION OF THE JUTE MANUFACTURES.

The manufactures from jute or pat may be referred to three primary sections:-

 CLOTH of different qualities ranging from substitutes for silk to shirtings, curtains, carpets, and gunnies.

II.—PAPPER chiefly prepared from the "rejections" and "cuttings."
III.—Cordage from the coarser and stronger qualities.

These three sections may each be referred to a number of sub-divianged in two leading groups, "hand-loom," and European made in Europe or in India.

We shall first enumerate the indigenous manufactures, since these bear on the history of the industry.

INDIGENOUS MANUFACTURES.

second by the takur, and the third by the glurgurra.

2 0

Indigenous Cloth.—Every homestead in Bengal has suspended from a beam in the roof of the verandah a few bundles of jute fibre, which, while

Indigenous Manufacture.

CLASSIFICA-TION OF MA-NUFACTURE.

IQ2I

Manufacture.

1st, Trick cloth used for making gunny-bags. Of this there are three qualities, the best being known as americant. These correspond to the three qualities of hand-loom gunness in commerce.

C. 1922

The first is said tended CORDIA fragrantissima.

## The Jute Fibre,

CLASSIFICA-TIOV OF MA-NUFACTURES.

and, Fine cloth.—This is generally known by the name of mekli dhokrá, and is chiefly used as a cloth to sleep on; it is often beautifully striped blue or red.

3rd, Coarse cloth.—This is largely used for making the sails of country boats (gun), and also for bags to hold large seeds or fruits.

The following are the principal districts in Bengal where indigenous jute manufactures (hand-looms) may be said to exist to any considerable te a year; Dacca, Malda, 25,000;

European Manufactures. 1023

## EUROPEAN MANUPACTURES.

Cloth made i of carpets, curta tating silk fabric hemp: for this sprinkled with w

tons of train oil to 100 tons of jute. "Sprinkled with this the jute is left for from 24 to 48 hours, when after being squeezed by rollers and heckled, the fibres become beautifully soft and minutely isolated, and thereby

Dundee manufacturer experimented once more on the fibre, and the

for hemp. From that date jute gained rapidly in public favour. It is

re ed p-%r.

## Jure Waiskey.

WHISKET. 1924

waste fibre is by means of sulphuric acid converted into sugar and the resulting product thereafter fermented and distilled.

CORDIA, Linn.; Gen. Pl., II., 839.

1025

Cordia fragrantissima, Kurz , Fl. Br. Inl., IV., 139 ; Borgines. Vern.—Kalamet, Dungkalamet, Burn. References.—Kurz, For. Fr. Burm., 27 ; Gamile, Man. Timb., 271.

C, 1925

The Sebesten Fruit	CORDIA Myxa
Habitat —A deciduous tree of Burma, chiefly in the hills of Martaban and Tenasserim Structure of the Wood —Wood moderately hard, reddish brown with darker streaks, beautifully mottled, has a fragrant scent, should be better known. It has a handsome gram, and its fresh, fragrant odour makes it very pleasant to use. Pieces sent to London for sale in 1878 realized £4 to per ton (Gamble)  Cordia latifolia, Roxb., see C obliqua, Willd	TIMBER 1926
• •	
C. Macleodi, Hook f. & Th, Fl Br Ind, IV, 139  Ven — Dhergen, dhomen dhilun deman, adni, dahigalis, dihgan, Unio, Reda perponda Koi, Bharwar, belanian, Kanwar, Sunta, Dhaiwan, Ashan, Charan, dhamin, bhati Mar Bot Gord, Lauri kasamar, Kurku, Gondu, Raj, Godela, Merwara, Gadru, Almere  References — Brandis, For Fl, 337, Gamble, Man Timb, 371 Dithie, Report on Bat Tour in Merwara 17 Griftih, Cale Your Nat Hist, Ill 393, Baden Fordil, Pb Fr, 575 Lisbon, U Fl Bomb, 103  Habital—A middling-sued deciduous tree of Central India, the Con	1927
can, and Belgaum  Gum.—Mr E A Fraser (Assistant Political Agent) says that in Ráj- putana this tree affords a gum  Mediche —The Santáis use the bark medicinally in jaundice (Camp- bell)  Structure of the Wood —Heartwood light brown, beautifully mottled with darker veins, even-grained, very hard, strong tough, and elastic, seasons well and works easily I is used for furnture, picture frames, and other ornamental work, also for fishing rods which are said to be excellent. It deserves to be better known and more used. The Santals value the timber for making bullock yokes	GUM 1928 MEDICINE 1929 TIMBER. 1930
C. Myxa, Linn, Fl Br Ind, IV, 136, Wight, Ic, 1 169  This fruit is known as the Sebesten by Anglo-Indians  Vern—Lasora, lasora, bhokar, gond, Hinn, Bohari, buhal, bahubara boh-dari Beno, Lambara, Pe, Boila, barrala baurala Kumaon, Karn Me, Beno, Lawara, Pe, Boila, barrala baurala Kumaon, karn Me, Beno, Lawara, Pe, Boila, barrala baurala Kumaon, bahakar, sepistar, gundo, thokar, t	1931

	• •
CORDIA   Myxa.	The Sebesten Fruit.
GUM. 1032 DYE. 1933	Pr., 169; Sind Gaz., 559; Bomb. Gaz., XV., 65; XIII., 23, VII., 41, Ind. For. VII., 82, IX., 216; Smith, Dic., 374; Kew Off. Guide to the Miss. of Ee. Boh., 58.  Habitat.—A moderate-sized for a large sub-Himidayan tract, from the the Khássa Hills, Bengal, Bur tral, and South India.  Mr. Atkinson says it is cultivated throughout the plains: is wild along the Himidayas, and flowers in March and April, the fruit ripening in May to July.  Gum.————————————————————————————————————
1934	ing boats; tuses are also made from it. James, in his report of Chanduka (1847), says "that from the inner bank is obtained a fibre, from which the
MEDICINE.	is. It is used in t gargle the d cent a lar color the nut, that of C. Myxa cannot; on sawing through the nut a heavy dis-
FOOD. Fruit. 1936	of which is soft and clammy.  "The fruit when ripe is eaten by the natives and also pickled." *: the smell of the nuts when cut is heavy and disagreeable; the taste of the kernels is like that of filberts" (Drury).  In a report on Chanduka in Smd (1847), it is stated that the fruit, which "contains a great deal of muchage, is eaten by the natives; it is also used in the preparation of spirituous liquors" Mr. Akkinson says the unripe fruit is pickled, and the ripe fruit eaten raw or stewed. Dymock mentions that the fruits were eaten during the famme of 1877-73 in the Nasik District.  Fodder.—The leaves are given to cattle as fodder. The lac insect
FODDER, 1937 719868, 1938	Fodder.—Inc leaves are given on the first of the fodder of the fodder forester, VIII., 80. Structure of the Wood.—Wood grey, moderately hard. In spite of its softness, it is fairly strong, and seasons well, but is readily attacked by insects. It is used for boat-building, well-curbs, gun-stocks, and agric. 1938

The Sebesten Fmit.	CORDIA Rothii.
cultural implements; in Bengal for canoes. It might be tried for tea- boxes. It makes an excellent fuel in a report of Chanduka in Sind (1847), it is stated that "the wood is used for sword sheaths." The Sandals regard the wood as specially useful for yokes, as it does not irritate  Don wrappe occurs feaves (  Anishe says lands are tried for tea- box sword sheaths." The Sandals regard the wood as specially useful for yokes, as it does not record to the same tried for the same tried f	1939
the wood is used to procure fire by friction. Mr. Atkinson says of the North-Western Provinces that the leaves are used as plates, and that the viscid pulp of the fruit is used as bird-lime.	
Cordia obliqua, Willd.	1940
This is the larger Spresten according to Stocks, Dymock, Birdwood, &c, C. Myxa being the lesser, but the vernacular names given would imply the reverse to be the case.	
Com ( * 1 = =	l
hnaari, Beng , Pens , Chhoi: Gidri, Stenj mekkera-cheitu,	
de .  Walter Elliot gives this plant the Telegu name of Kicka viri chettu, and remarks that its synonym Siéshmataka is correctly translated "phlegm-dispeller."	
References —Roxb., Fl Ind., Ed. C.B.C., 198; Brandss, For Fl., 336, Dals & Gibs., Bomb Fl., ymack, Mat. Med. W Ind., Burdwood, Bomb. Pr., 58,	
Habitat.—Found in Western India (especially Guzerat), from the	
nd (	MEDICINE.
regarded as a demulcent	1941
Special Opinion - "The front on the second of the second	[
Food.—The fruit is eaten, and in the Deccan is generally known as bhokar Dr. Dymock says the flowers and fruit were gaten at the house	F00D. 1042
during the famine of 1877-78.  Structure of the Wood - Very much like that of the other species.	,
Stocks remarks that in Sind it is regarded as tough, and is in considerable demand	1943
C. Rothii, Rom & Schult; Fl. Br. Ind , IV., 138.	1944
ndu, mundi	l

C. 1944

ndus, gundî, iD ; Narvilli, , 271 ; Dals. CORDIA

Myxa.

trat, and South thora.

The Sebesten Fruit.

Pen 1995 Sint Gasa tto; Rimb, Gasa, XV., eA; XIII., 23. VII., 42; Int. been VII., et, IX., 2163 Smith, Disa 514; Kew Of. Guide to the Mus. of to, Ret., 58.

Mr. Alkinson says it is cultivated throughout the plains; is wild along the I madayas, and flowers in March and April, the fruit ripening in May to July.

. . --- --- with the st - Salt Range

a 5 noo feet, inara), Cen-

GUM. 1032 DYE. 1033 FIBRE.	Gun.—Said to yield a gum in Rajputana.  Dyc.—Dr. McOann states in his hisport on the Dyes of Bergal (pp. 32, 35, and 143) that the green leaves of this tree are in Darjiling used in decling, along with Moriada tinctoria. In the NW. Provinces the juice of the fruit is used as a dye (Atkinson, Econ. Prod., NW. P., V., 81).
1934	
,,,	
MEDICINE.	
1935	
	the dried fruit is valued on account of its muchaginous nature and defluence reproperties." In large quantiles it is given in bihous affections as a laxative. "Both kinds of fruit when dry are shrivelled, and of the colour of a dry prune." The pulp of C. oblique can be separated from the nut, that of C. Myra cannot; on sawing through the nut a heavy disagreeable smell is observed "[Dymock]. The kernels are a good remedy for ringworm. Mr. Baden Powell says the leaves are useful as an applied of the colour of the col
F00D. Fruit. 1936	cooling, and demuscan (10.10.10.) Face.—The fruit grows in clusters and consists of a drupe, the pulp of which is soft and clanmy. "The fruit when ripe is eaten by the natives and also pickled." the smell of the nuts when cut is heavy and disagreeable; the taste of the kernels is like that of filberts" [Drury].
	In a report on Chanduka in Sind (1847), it is stated that the which "contains a great deal of muclage, is eaten by the allives it is which "contains a great deal of muclage, is eaten by the allives it is which "contains a great deal of muclage, is eaten by the Arkinson says Dymock 7-78 in the
fodder. 1037 Timber. 1938	Nasik Distruct. Fedder.—The leaves are given to cattle as fodder. The lac insect feeds on this plant (Indian Forester, VIII., 83) Structure of its soltness, it is readily attacked in soltness, it is unstocks, and agri-
	C. 1938

The Sebesten Fruit.	Rothu.
cultural implements; in Bengal for canoes It might be tried for tea- boxes. It makes an excellent fuel In a report of Chanduka in Sind (1847), it is stated that "the wood is used for sword sheaths" The Santals regard the wood as specially useful for yokes, as it does not	
The state of the s	DOMESTIC.
the wood is used to procure fire by friction. Mr. Atkinson says of the North-Western Provinces that the leaves are used as plates, and that the viscid pulp of the fruit is used as bird-lime.	
Cordia obliqua, Willd	1940
This is the larger Spherry according to Stocks, Dymock, Birdwood, &c., C. Myxa being the lesser, but the vernacular names given would imply the reverse to be the case	
HIND, Chhoto bohnaari, Beng, gu in in, ind., hinting smail, gu in in, ind., hinting smail, gu in end., rappellar, sapitalin, Pres. Chhotil Bargand, three narwell: TAM, Chinna-balaku, chinna mekkera-chella, Tat., Kolté, Malar, Janus, Hursi d  d  d  d  d  d  d  d  gu in in, ind., juni, gu in, gu in, gu in, gu in, gu in, juni, sun,	
ymack Mad Med W Ind., Birdwood, Bomb Pr., 58, Habitat — Found in Western India (especially Guzerát), from the	
rd 15	MEDICINE 1941
'regarded as a demuleent' Special Opinion —"The fruit in its raw state contains a gum used beneficially in gonorrhosa" (Assi Surgeon T N Ghose, Meerul) Food —The fruit is catien, and in the Deccan is generally known as bhokar Dr Dymock says the flowers and fruit were caten in Khandesh during the famine of 1877 78  Structure of the Wood —Very much like that of the other species Stocks remarks that in Sind it is regarded as tough, and is in considerable demand	F00D 1942 TIMBER. 1943
C. Rothu, Rom & Schult; Fl Br Ind, IV, 138	1944
References 19.12 in a	] : :

	and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and t
	Habitat. A email trend the dry owner of Nieth-West, Central, an South led as pivet for its Rajgurdina. Stocks cays that it is a south-
eux,	Game - The last sales as more total about a source wat the conservations
1015	prepared at Com' at ec. In the Hom'ay Guerreer of five da D tel t.
	the probabilities of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state
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	Filte -The Proceedings tack yields a course groy, white tan fire which is made in terms. Buchanan, in 1 of mency the 12th Mysore, treptons having area recorded the last of the 12th of the
1910	with it made in some. Buchanan in the enew the neh Water
	trentiens having tren to peace the back of the nermali or Cord a angusti
	folia, which he i send ecommon more Severelynese.
MEDICINE.	Medicine. The electricate of the back possesses autiligent properties
1017	and is nied as a garp'e.
roop.	Past William Ray P.
1018	In Sord Water and a saven by the power clause and is also picked.
TIMBLE.	In Sind the transfer of the same at a first
	Struct 'ti-ti-ti-ti-ti-ti-ti-ti-ti-ti-ti-ti-ti-t
1949	in Snd ' iden
	Powell car-
	riage per transaction to the tra
	1
1950	Cordin mostita Itali C to The AT De Tal III and
-75-	Cordia vestita, Hert. f. to Th.; Fl. Br. Int., IV., 139.
	Syn -Ginelou vertite M. DC.
	Vern,-Kanti, Jards, In. 2 Kam painto, pin, Indit, chiata, njanta kairula, berula, 18120.
	References - Brandis, For. Fr. 329; Gamble, Stan. Tonb., 271; Albinton, Econ. Pr. d., N., W. P., V., 611 Baden Powell, Ph. Pr., 575.
	the sub-Himdlayan tract, from
	the other species, and when ripe
MEDICINE.	the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s
1951	is an article of food; it is considered better than that of C. Myxa. Mr. Atkinson states the flowers appear in spring and the fruit ripens in
	Atkinson states the flowers appear in spring and the fact them is
	- Pulp which is
i	appearance to
TIMBER.	appearance to e occasionally interrupted; it is strong and is used for wheel and well-work.
1952	that of C. Macleodii, except that the come
-/	interrupted; it is strong and is used for wheel and well-work.
- 1	
*050	CORDAGE AND ROPES.
1953	Many fibres are used for this purpose; infact, the natives of India are
	Many fibres are used for this purpose; milet, the bark of which will
1	Many fibres are used for this parious, in a plant the bark of which will never at a loss when in the forests to find a plant the bark of which will never at a loss when in the forests to find a plant the bark of which will never at a loss when in the grant of the majority of such plants are
Į.	never at a loss when in the forests to find a partition of such plants are serve the purpose of a string or rope. The majority of such plants are
	more or less used locally " ! I form of form in the name in
	siderable number are of
	serve the purpose of a string or rope. The farmers or cords; a consorrer or less used locally in the names in siderable number are of two two to indicate the following list have been the following list have been the fibers which
1	the following list have bee the fibre-yielding plants frequency
1	the fibre-yielding plants frequency hold a position of commercial importance ( indicating greater
ł	importance than *):
	importance than "1:

Abntilon asiaticum.
A. Avicennos.
A Agave americana.
Alnus ultida (bridge ropes).
Artocarpus Lakoocha.
Arundo Karka.

importance than *):-

· Abroma augusta.

B. racemosa.

* B. Vahlil.

Bixa Orellana.

Bothmeria macrophylla (fishing nets).

Bombax malabaricum.

Bauhinia anguina.

C. 1953

# Cordage; Conander.

CORIANDRUM sativum.

Leptadenia Spartium. Borassus flabelliformis. Broussonetia papyrifera. * Linum usitatissimum (flax). Butea frondosa. * Malachra capitata. Maoutia Puya (fishing nets). Calamus Rotang. * Calotropis gigantea (string). Marsdenia Roylel. ** Cannabis sativa. M. tenacissima (fishing lines) Careya arborea. Melochia velutina. Carrota urens. Memorialis pentandra. Moringa pterygosperma, Chamterops Ritchiana. ** Cocos mucifera (coir). ** Musa textilis (Manilla hemp). Ocimum Basilicum. * Corchorus, sp. (jutc). Cordia Myxa. Odina Wodier. C. Rothu. Orthanthera viminea. Crotalaria Burhia. Pædena fætida. ** C. junces (Sunn-hemp). Pandanus odoratissimus. Parrotia Jacquemontiana (bridge Daphne papyracea. Debregeasia bicolor (fishing lines). Periploca aphylia. D. leucophylla Phoenix paludosa. D. longifolia. P. sylvestris. Desmodum tilizefolium. * Phormum tenax. Dombeya umbeliata. Pouzolzia viminea. · Saccharum Munja. Edgeworthia Gardneril. Enolwaa spectabilis. 5 spontaneum Figus bengalensis Sansemeria zeylanıca. * Gerardinia heterophylla. Sarcochlamys pulcherrima. Gnetum scandens (fishing nets). Sesbama aculeata. ** Gossypium, sp. (cotton). S ægyptica. Sida rhombifolia. Grewia asiatica. G oppositifolia. Silk-Tasar and Eri are sometimes * Hardwickia binata. used for fishing lines Helicteres Isnra. * Sterculia villosa. ** Hibiscus cannabinus Thespesia Lampas. H. esculentus. T. populnea. H tiliaceus Urena lobata Holostemma Rheedel, Villebrunia appendiculata (ropes, strings-fishing lines). *Ischœmum angustifolium/≈Pollinia

# CORIANDRUM, Linn, Gen Pl, 1, 926

erropoda).

Laportea crenulata.

CORIANDER.

The name of this genus comes from Lopis a bug, in allusion to the

Yucca gloriosa (lines)

Coriandrum sativum, Linn, Fl Br. Ind, II, 717, Wight, Ic,

Vern - Dhanya or dhansa, HIND, Dhane, BENG, Dhanya, dhana (the

300	Dictionary of the Feonomic		
CORDIA vestita.	Core	dage and Ropes	
син 1945	to be seen in Sind gardens, Gam.—The bark, when we prepared at Combatore. In	ne dry zones of North-West, Central, or hiputana. Stocks says that it is sometimized, sields a gum which is reported to be the Bombay Gazetteer of Baroda Distinc- the poor and pickled, as is the gum which the poor and pickled, as is the gum which	
194 <b>0</b>	Fibre.—The liber or inner which is made into rope But	bark yields a coarse grey, white bast fibrithanan, in his 'Journey through Mysore, 'talan's o' the narmuli or Cordia angust	
MEDICINE. 1917 FOOD. 1018	and is used as a carele.	possesses astringent properties	
1949		Used for fuel ients. Bader making car- wood of the <i>liyar</i> is much used in Sind.	
1950	Cordia vestita, Hook f. & :	Th ; Il. Br. Ind , IV., 139.	
MEDICINI. 1951	References — Brands, Attenson, Econ Prod., Habitat — A small deciduou the Jhelum to the Sarda River Medicine — Fruit used simi	darly to the other species, and when ripe	
TIMBER. 1952	the runs He remarks that the commonly eaten and considered Structure of the Wood—1 that of C. Macleodii, except il intercupted; it is strong and is	he wood is very similar in appearance to hat the concentric lines are occasionally used for wheel and well-work.	
1953	Many fibres are used for the never at a loss when in the fore serve the purpose of a string or more or less used locally in the siderable number are of commenter following list have been place the fibre yielding plants frequented to a position of commercial importance than ")— "Afroma augusta. Abrution assaticim. A Arteenro "Agreemerteana Alnus attida (bridge ropes). Artiocarpus Lakoocha. Arundo Karka	ed one or	
	C 1953		

### Coriander.

CORIARIA nepalensis.

been indicated by the formula CiollinO, and is therefore isomeric with borneol. By abstraction of the elements of water (by means of phosphoric anhydride) this is converted into an oil having an offensive odour CiaHia (Pharmacog., p. 330). P C10H18 (Pharmacog., p 330). I found Corrander seeds to conta

&" Corrander fruit contains at

borneol, a fixed oil, is also pre

being submitted to distillation" (Professor Warden, Calentia).

Medicine,—The medicinal properties attributed to this plant are

many,-namely, carminative, refrigerant, diuretic, tonic, and aphrodisiac. The dried fruit and the volatile oil are used as an aromatic stimulant in MEDICINE. 1950

rosebuds, cardamoms, cubebs, almonds, and a little black pepper; it is

with good results (Bhagwan Dass (2nd), Assistant Surgeon, General Hospital, Rawal Pinds, Panjab) "The roasted fruit s generally used" (Dr Bensley, Civil Surgeon, Rajshahye) "A strong decoction of the seeds with milk and sugar to taste, is given in cases of bleeding piles" (D R Thomson, M D. CIE, Surgeon Major, Madras) "Useful as aromatic, stimulant, and carminative" (S. M. Shircore, Civil Surgeon, Moorshedabad) "It is reputed as an antibilious remedy." (T. N. Ghose, Assistant Surgeon, Meerut) "Cold infusion of seeds found to be very useful in colics of children, powder of fried seeds" (Shib Chunder Bhattacharji, Assistant Surgeon, In Civil Medical Charge Chanda, Central Provinces)

Food -Eaten by the natives as a vegetable. The seeds are universally used as a condiment, and form one of the ingredients in curry. I hey are also employed in confectionery, and for flavouring spirits.

CORIARIA, Linn ; Gen. Pl , I , 429.

Coriaria nepalensis, Wall., Fl. Br. Ind, II., 44, Vern -- Masuri --- 1- Li ...

bears the fe Shalu, baul phapharchor

ru, pajerra, derences.—Brandis, For Fl, 128; Kure, For Fl Burm, II. 281; Gamble, Man Timb, 113, Slemari, Pb Pl, 39; Atlchison, Cat Pb and

C. 1958

FOOD

1957

### CORIANDRUM sativum

#### Coriander.

References - Roxb, Fl Ind, Ed C B C, 272; Voigt, Hort, Sub. Cal, 23; Dals. & Glos., Bomb. Fl, Supp, 41; Stewart, Pb Pl, 108; Flora An-

Batten, 279; Spons, Fncyclop, 1420, 1808; Balfour, Cyclop, 831, Ireasury of Bot, 331; Morton, Cyclop Agrs, 545 547; Ure, Dic Indus, Arts and Manuf, 907.

Habitat.—A cultivated plant found all over India It seems to be sown at various seasons in the different provinces and regions of India. In Bengal it is grown during the cold season: Roxburgh says this is the

"Conander is grown as mixed with uppara

cotton and sown broadcast in October and ripens in January; occasionally it is grown as a garden crop from June to September, watering once a week being sufficient. The seed is about to to 12th and the outturn is

, and Edgeworth juasi-wild state."

Alkinson and several other writers allude to it as a crop met with in the North-Western Provinces, and in Rumson it is stated to ripen in May,

inces. I his tidut is disout iti, one in the present century, the seed for to be

the yield being about 15 Lwi.

grown in various other parts

proportion of the world's sup,

continues drawn from India. Ainshe states that in the beginning of the

oil. 1955

CORNUS

macrophylia

COFIN—1 term often specifically applied to Avena satura, but generically given to all cultivated grasses which yield farinaceous grains, such as Wheat, Maize, Barley, Oats, &c. When ground, Corn is designated flour or meal. See Avena Vol. 1, 1631	1963
Corn-flag, see Ins	
Corn-Indian, see Zea Mays	
Corn-silk—the s lky stigmata of Zea Mays, from which a medicinal pre- paration is made See Zea	1964
CORNUS, Linn, Gen Pl, I, 950	1965
[1 122, CORNACFE] Cornus capitata, Wall, Fl Br Ind, Vol II, 745, Wight, Ill,	1966
Syn — Berthmain Fredhera, Lin II Vern—Thommal, thorial, thorain, their, bomaur, bamora, Hind Vern—Thommal, thorial, thorain, their, bomaur, kunnon References—Benadis, For IF, 255, Gomble, Van Timb, 211, Stewart, Pb Pl, 111, Annile, Mat Ind, II, 454; *O Shaughness, 375 O Shaughness, Beng Pharm, 40, Althinon, Econ Prod. 1, 73, Treasury of Bot, 333  Habitat—A small deciduous tree of the Himálaya, from the Beas to Bhután, between 3 500 and 8,000 feet met with also in Khasia hills, where	
11	
the lower hot valleys growing along with the berberry	

Food -Dr Stewart says that the npe fruit is sweetish, and is ap

parently made into a preserve and eaten by the natures. It resembles a strawberry somewhat in external appearance, and ripens in October

Structure of the Wood - Whitish, with redd sh brown heartwood, warps in scasoning, very hard, close grained, used only for firewood

C. macrophylla, Wall, Fl Br Ind, Vol II, 744

Vern.—hasir kachır haleo allıan hadda harru nane kandara, kaksh kachur, kochan kageha ruchia Hind , Kandar, HAZARA, Haleo, PB,

> imble Man Timb 212 Dispens 275. O Shayah

Dispens 375, O Shaugh
Pb Pr, 575 Atkinson,

LLOR 1 100 . 1 . 13

Habitat.—A tree, 40 to 50 feet high, frequent in the Himalaya, from the Indus to Bhután, between 3000 and 8,000 feet, found by the writer in Manipur It flowers in May and June

01L 1070 000ER 1071 W00D

FOOD

1967

WOOD

1968

^{*}Cornus florida, alluded to as having a medicinal bank, very similar in its properties to the bank of Melia Azadirachta

CORIARIA
nepalensis.

TAN.

IOSO FOOD and FOODER.

igóo Medicine.

1061

Coriaria.

Sind Pl., 35; O'Shaughnetee, Beng, Diepent., 270; Flack. & Hanh. Pharmaceg., 201; V. S. Diepens., 15th 1d., 1602., Baden Parell, 16. Un. 3c. 3c. 4th Altunon, Ilim. Deet., 742; Balfour, Cyclop., 813; Teasure of Bot., 311.

Habitat.—A decidious shrub or small tree of the outer Himálya from the India to Bhatan, according to 8,000 feet in the North-West and to 11,000 feet in Sikkim. Distributed to Maniphi, Burma, and Yunan. In Simla this common shrub flowers in February and March, but in Burma not till May. The abundance of this plant stems to have been the cause of the name Mussoorie being given to the North-Western Providence.

inces Hill station; Almora, the capital of Rumaon, being in a like manner the vernacular name for Rumex accessa. Tan.—All parts of the plant are tich in astringent acids which might

be used for tanning or for diving.

Food and Fodder.—"The branches are browsed by sheep. The fruit is very unstand but as eaten, although at times it is reputed to cause thirst and colic" (Dr. Streart).

Medicine. Leaves are said to be used to adulterate senna, and to act

hich occur in the works of the

die, and were at one time extensively used an an adultrant in Senna. Much has been written of the powenous properties of the New Zealand species, the Toot-poison—Contarta ruscfolta. Mr. Lander Lindsay gives an elaborate account of the properties of that plant in the British and Foreign Medico-Churugical Review (186x, p. 153, and 1868 p. 465). M. Biban attributes the poison of the truit to an active principle, which he has called coriamyttin, the composition of which is represented by the formula Capt. 4, 50 p. a substance ranked with the glucosides.

The inhabitants of New Zealand extract an intercating beverage

from the pulp of the fruit.

Professor Warden of Calcutta has furnished the following brief note regarding Coriaria: - "The Coriaria rustifolia seeds contain a resmous contain a casmous contain a casmous contain a casmous contain a cat, after

h, however, the

TIMBER.

orted by cattle

for boxes and small articles At present it is only used for firewood, but as such to a large extent in the Simla District.

[.] References to the Mediterranean or New Zealand species.

### Corundum or Emery Stone,

far between. between Pi sidered by .... b. 20: anc.

The finest quality of Corandam is perhaps that obtained

### CORYDALIS Govaniana.

≠¢n

C. 1982

of the Man crystallized ( tone is also reported as occurthern India, the localities are nalem district, Mysore State, Arcot district, Kistna and 1979 Godayari, and Hyderabad territory, and on into the Central Provinces, "The uses to which Corandum is put, when powdered, are well known, The consumption in India must be considerable, though possibly it was an the tends of the not us arms trar is bv be found scattered throughout India. To what extent Indian ory well known, but it for which the emery to a monopoly at one don" (See Manual of V., 46-49; Manual of Coimbatore, p. 23). Emery is said to be largely exported to Bombay (Madras Manual of Administration, II., 38; Settlement Report of Upper Godavery Dist., 42: Balfour, Cyclopadia of India, 816). CORYDALIS, Linn.; Gen. Pl., I., 55. [Ill., t. 16, f. 2; FUMARIACEA. Corydalis Govaniana, Wall; Fl. Br. Ind., Vol. I., 124; Royle, 1080 Vern .- Bhutkis, bhutkesi, HIND. & BENG.; Bhutakesi, SANS. (Dutt. Mat. Med. Hind.) Some doubt seems to prevail as to the source of the budthes of the drug shops. Stewart says that in the Ravi basin that name is given to the root of a Ptychotis. References .- Stewart, Pb. Pl., 10, 109; Pharm. Ind , 23, O'Shaughnessy, Beng. Dispens., 185; U. C. Dutt, Mat. Med. Hinds, 201. all task-ran a mines found in the North, West II'ms. MEDICINE. 1081 Corydalia. 1082 and allowed to evaporate spontaneously, deposits abundant crystals of the alkah, termed Condalia. -⊾ it the ıch

root, usually sold as Aristocochia root, and used chiefly as an external

572

## CORUNDUM.

### Emery Stone

# 1973

Cornus obionga, Wall; Fl. Br. Ind , II., 744.

Vern .- Kagshi, Sutlej; Dab, Kunawan, Kasmol, bakar, ban-bakur, hald, Hind

Relectences —Brandss, For. Fl., 153; Kurs, For Fl., I., 545; Gamble, Sian Timb, 212 Stemart, Pb Pl., 111; O'Shaughnessy, Beng Dispens, 375; O'Shaughnessy, Beng Pharm, 39, Baden Powell, Pb. Pr. 576.

Habitat—A small tree of the outer Hundlaya, from the Indus to Bhutan, between 3,000 and 6,000 feet, met with also in the Martaban Hills, Bunna, between 4,000 and 7,000 feet (Kurs)

Structure of the Wood.—Pinkish-white, hard, even-grained, warps and has an unpleasant scent.

1975 C. sanguinea, Linn; Fl Br Ind, II, 744.

THE DOGWOOD, DOGBERRY, OF HOUNDS' TREE, a name given in consequence of a decoction of the bark having been formerly used for washing mangy dogs; sometimes also called the Cornel Tree

References — Brandis, For Fl. 253, Gamble, Mon Timb, 212; O'Shaughnessy, Beng Dispens, 335. O'Shaughnessy, Beng Pharm, 39, Cooke, Oils and Oilseeds, 38, Smith, Dic, 156

Habitat—A shrub or small tree found in Europe, Siberia, and in Kashmir, in the last-mentioned country at 7,000 feet in altitude. The writer found the plant also growing near a village in Chumba State, but it may there have been only cultivated. The young shoots are red in spring, and the leaves turn of that colour in autumn, hence the specific name given by botanists.

From the black surning in lamps a cherry—Cornus

mascula, a shrub of Europe and Northern that he are contain an useful oil. These facts would seem to suggest that the Indian species should be more carefully examined, as they also may be found to afford all Structure of the Wood—Hard, much valued in Europe for the

manufacture of small articles such as tooth-picks, butchers' skewers, &c It is valued as affording an admirable charcoal for gunpowder

Coromandel or Calamander-Wood, see Diospyros quasita and D. hirsuta.

Coroxylon Griffithii, a misprint which appears in Balfour's Cyclopadia and in the writings of other authors. See Caroxylon and also Haloxylon

Corrosive sublimate, see Mercury

1978 Corundum.

EMERY STONE, L'ng., L'EMERI, Fr., SCHMERGEL, Germ, SMERIG-LIO, Ilal

Vern,-Kurund, HIND , Samada, Guj

This, the industrial form of the mineral, is a granular alumina, with which a small amount of magnetic from is associated. It is very feel distributed among the crystalline rocks of Southern India, but the localities where it is sufficiently abundant for industrial work are few and

C. 1978

WOOD. 1974

oil. 1976

wood. 1977

### Corundum or Emery Stone.

### CORYDALIS Govaniana.

The finest quality of Cornndam is perhaps that obtained pply is con-GSI,V.In Part IV. varieties: c rocks of n immense l as occurcalities are sore State, ustna and 1979 Godavari, and Hyderabad territory, and on into the Central Provinces. "The uses to which Corandum is put, when powdered, are well known. The consumption in India must be considerable, though possibly it was larger formerly than it is at present, as the trade of the native armourer is Emery is said to be largely exported to Bombay Coimbatore, p. 23) (Madras Manual of Administration, II, 38; Settlement Report of Upper Godavery Dist., 42 ; Balfour, Cyclopædia of India, 816). CORYDALIS, Linn.; Gen Pl. I. 55. [Ill, t 16, f. 2; FUMARIACEE. Corydalis Govaniana, Wall; Fl Br Ind, Vol. I, 124; Royle, 1980 Vern -Bhutkis, bhutkess, HIND & BENG , Bhutakess, SANS (Dutt, Mat Med Hind ) Some doubt seems to prevail as to the source of the budkhes of the drug shops Stewart says that in the Ravi basin that name is given to the root of a Ptychotis. References.—Stewart, Pb Pl, 10, 109 Pharm Ind, 23, O'Shaughnessy, Beng Dispens, 185; U C Dutt, Mat Med Hind, 294 Habitat - A small herbaceous plant, found in the North-West Himá-MEDICINE. Root. 1081 Corydalia, 1082 and allowed to evaporate spontaneously, deposits abundant crystals of the alkalı, termed Corydalia h it the nch .wen in solution to dogs without inconvenience." "The Corydalis tuberosa and fabacea in Europe have a bitter acrid root, usually sold as Aristolochia root, and used thiefly as an external C. 1982

• • •	
CORYLUS Avellana.	
1983	application to indolent tumors. The small quantity in our possession alone presented the Copydalia and its salts from being extensively tried in the treatment of ague. The chemical properties of the salts are closely analogous to those of nforphia and antreotine; an interesting fact, as it strengthens the resemblance already detected by botanists between the Parviranca: and Puniare. It might be added also that the relation of these orders to the Rindwaculueza, through Coptis and to Brankateza: herough the beforery or raison extract, is similarly borne out by their chemical and medicand properties. (See the next species and compare with the remarks under Coptis Teeta, C. No 1789, and Berberis Lycium, B. No. 460; also Picrothiza Kurroa).  The Turkey-corn or Turkey-pea (Corydalia Iormosa) contains in its roots, according to Mr. W. T. Werzell, the alkaloid corydaline, former need, bitter extractive, an acrid resin with volvule oil, a tasteless resin, ohe,
medicine. 1984	ning for the alkaloid (Corydaline) found in the European species—Corydalis tuberosus.  The roots of all these plants are supposed to be tonic, diuretic, and alterative, and are prescribed in syphilitic, scrofulous, and cutaneous affections, in the dose of from ro to 30 grains. The drug is also often used in the form of a decoction or tincture.
	Corydalis ratmosa, Wall, Fl. Br. Ind., I., 125.  Dr. Aitchison, in his Flora of the Kuram Valley (Linnaan Sec. Janr., XIX., page 145), says that in Kuram this common Himilayan scrambling annual is employed medicanally by the natives in the treatment of eye diseases, like all other plants with yellow sap. It is there called manifedn. It would be interesting to know if this plant is used medicinally in other
	C + A + C H +
	CORYLUS, Tourn.; Gen. Pl., III., 406.
1985	Corylus Avellana, Linn., Cupulifera
	THE EUROPEAN HAZEL.
	Vern.—Findak, bindak, Hind, Pers; Chalgosa, Pers References.—Brandis, For Fl., 1911 Gamble, Man Timb., 300; O Shaugh- nessy, Beng, Dispens. 609; U. S. Dispens, 15th Ed., 977; Baden Powell, Pb. Pr., 208, 385.
	Habitat —Found in England, France, and eastward to the Caucasis and in Asia Minor Alluded to by some authors as cultivated on the coobable semi-
MEDICINE.	tonic,
1086 FOOD.	in the
Nuts. 1987	India are probably an obtained from the I
	C. 1987

Woon.

1002

roop.

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1003 w 665.

1001

1925

	RYPHA raculifera.
Corylus Colurna, Linn.	1938
Syn—C LACERA, Wall  Vern.—Unit, Inclam, Wart, wer, warani, warya, things, thankoli, Kanning and Chimbel Janga, Chennell, Sharis, sharoli, tangale, ch., ban dilla, Sutley, Kagba, bhotao badan, Kunaon, Shirol, Gunin Li, Yhang, Kandhada, Fernell, Paper, Lacenter, Chimbell, Paper, Lacenter, Paper, Lacenter, Paper, Lacenter, Paper, Pa	OIL. 1989 Medicine. Nats 1000
nearly as good, and are largely exten, being exported from the various hill stations in the Himálaya. The hazel nuts from Afghánistan and Rashmír are much more like the European nut, and are recognised by the natives of the plains as distinct from the Himálayan form. It is thus probable that they are either obtained from C. Aveilana or from a cultivated superior stock of C. Columa. Ascen in the forests in the Simila district, the actual nuts are smill and rarely mature their kernels, but they are encased in a large coarse outer coat and form large succulent heads.	FOOD Nuts 1991

better known, especially as many specimens show a fine shining gran resembling Bird's-eye Maple

C. ferox, Wall J. Gamble, Man. Timb., 200

Vern —Cuert, Neral, Langura, Bhulla Habitat — A small tree of Nepal and Nikhm, S. km to 10,000 feet Food —The fruit is covered with a prinkly cup the kernel is ed ble Structure of the Wood —Pink sh white, maderately hard, even-

Structure of the Wood - Pinkish-white, moderately hard It is only

used locally, but it is well grained and does not warp, and deserves to be

CORYPHA, Linn , Gen. Pl., III , 922

Corvoha umbraculifera, Linn , Palika

grained

THE TALIFOT PAIN OF CETLON AND THE FAN PAIN OF SOUTH INDIA

Verb - Fan In and a red a red resident, then the first of the

some, but according Tab., Shreadom, Tri., Androgona, Michert., I andro as his Mar. Done between their ham Tab., Dan Jen., Dr., Landon, and Lindon, Dr. and Landon, Lan

C. 1995

the alkaled (Lerysteine) found in the Luropean species Lorydalis inbernana. MEDICINE. 1081

The roots of all these plants are supposed to be tonic, duretic, and alterative, and are prescribed in syphilitic, scrolulous, and cutaneous affections, in the dose of from 10 to 30 grains. The drug is also often used in the form of a decoction or fincture.

Corydalis ramosa, Wall; Fl. Br. Ind., I., 124.

Or, Altchison, in his Flora of the Kuram Valley (Linnaan Soc. Jour., the tours of Himalayan scrambling in the treatment of eve is there called mamiran.

CORYLUS, Tourn. ; Gen. Pl., III., 406.

Contract C

Corvius Avellana, Linn.; Cupulifere. 280I

THE EUROPEAN HAZEL.

Vern .- Findak, bindak, Hino., Pens.; Chalcona, Pens.

References .- Brandis, For. Fl., 421; Gamble, Man. Timb., 370; O'Shaughnessy, Beng, Dispens , 609; U. S. Dispens., 15th Ed., 977; Balen Powell, Pb. Pr., 268, 385.

1 --- and in the Caucasus on the probable or semi-

is tonic,

l in the sea-port towns. Those carried into the towns of Upper and Central India are probably all obtained from the next species.

C. 1987

MEDICINE, 1086 F00b.

Corylus Colurna, Linn. Syn -C LACERA, Wall CORYPHA

umbraculifera.

17 am 17 1 m; 117	
•	
Habitat.—A moderate sized tree of the North-West Himályy, be- tween 5,500 and 10,000 feet. The flowers appear in March and April, and the fruit ripens in the rains. "The trees bear every third year, and yield a crop sufficient for export to the plains" (Atkinson).	
Oil —There seems no reason to doubt but that an oil could be pre- parted from this species of hazel as well as from the European nut. No mention is, however, made of the natives of India extracting oil from it, which all the plant as fix and a doubt a the temperate forests, so	1989
nuts sellers' shops, being	MEDICINE
Food.—The nuts are smaller than the European variety, but are nearly as good, and are largely eaten, being exported from the various hill stations in the Himálaya. The hazel nuts from Afghinistan and Kashmir are much more like the European nut, and are recognised by the natives of the plains as distinct from the Himálaya in form It is thus probable that they are either obtained from C. Avellana or from a cultivated superior stock of C Columa. As seen in the forests in the Similadistrict, the actual nuts are small and rarely muture their kernels, but they are encased in a large coarse outer coat and form large succulent heads.	Nuts 1000 F00D Nuts. 1991
Structure of the Wood —Pinkish-white, moderately hard. It is only warp, and deserves to be new a fine shining grain	Wood, 1992
C. ferox, Wall; Gamble, Man Timb, 390	
Vern.—Curri, Nepal., Langura, Bilutia  Habitat — A small tree of Nepal and Sikkim, 8,000 to 10,000 feet. Food.—The fruit is cowered with a prickly cup, the kernel is edible Structure of the Wood—Pinkish white, moderately hard, even- grained.	FOOD, Note, 1003 WOOD,
CODVDHA Int. Gr. P. III con	1991

CORYPHA, Linn , Gen. Pl., III., 922

THE TALIPOT PALM OF CEYLON AND THE TAN-PALM OF SOUTH

References -Rozb , Fl 'Ind , Ed CBC , 298-299 1 Volgt, Hort, Sub

Corypha umbraculifera, Linn , PALME

India. Veta —: panai, . Bajar

celectics — Ross, it is a fact of the property of the cells of the Ross of the Cells of the Ross of the Cells of the Ross of the Cells of the Ross of the Cells of the Ross of the Cells of the Ross of the Cells of the Ross of the Cells of t

CORYPHA umbraculifera.

The Fan-Palm of South India.

Plliot, Flora Andhelea, 1º9; Mairat, Man. Admin, 17; Mondren Sheriff, Supp. Pharm. Ind., 116; Druvy, U. Pl., 139; Roele, Fib. Pl., 83 Kew Off, Guide to the Must. of Ec. flot., 71; Kew Off, Guite to Bot. Gardens and Arboretum, 33.

Habitat.—A large tree of Ceylon and the Malabar Coast; cultivated in Bengal and Burma. But Boxburgh says it is "a native of Bengal, though scarce in the vicinity of Calcutta. Flowering time, the beginning of the hot season. The seeds tipen about nine or ten months afterwards." Reported to be very common in the moist regions of the Madras Presidency. This tall and handsome tree, Sir E. Tennet says

FIBRE.

1996

unstanting. Fibre.—The leaves are made into fans, mats, and umbrellas, and are used for writing on. They are also largely employed for thatching. Knox, a writer quoted by Royle, says: "Of this, the leaf, being dried, is very strong and limber, and most wonderfully made for mark's convenience to carry

- Charles (1)

Fibre-bundle,

to be strong and durable." It srems probable that, after removing the saxualar cords night extracted from the extracted from the and more pliable than those found at the bases of the leaves. Drury states that the leaves alone are converted by the Singhalese to purposes of utility.

Of the leaves alone are converted by the Singhalese to purposes of utility. The leaves alone are converted by the Singhalese to purposes of utility to the state of the leaves alone are converted by the Singhalese to purpose of utility to the state of the leaves alone are converted by the Singhalese to purpose of utility.

Paper (ofas).

· books and ordinary purposes. term applied to them when so employed, the leaves are taken whilst tender, and after separating the central ribs, they are cut into strips and boiled in spring-water. They are dried first in the shade and afterwards in the sun, then made into rolls and kept in store, or sent to the market for sale. Before they are fit for writing on they are subjected to a second process. A smooth plank of areca palm is ned horizontally between two trees; each ola is then drawn backdamped. . wards an face becomes the moisture perfectly . mplete. The dries up. .

Brajds.

smoothing of a single old will occupy from 15 to 20 minutes." The writer cannot discover any description of the preparation of the palm leaves as adopted in India, and in the case of the Palmyra palm (see B. 779), oil is employed to give the polish. The whole subject of these prepared slips of palm leaves is worthy of more attention, since they are coming into European commerce in the manufacture of ornamental braids and in the construction of straw or Leghorn hats.

Food—A kind of sague syielded by the pith. Little information of

Food.—A kind of sago is yielded by the pith. Little information of a definite kind can be discovered as to the extent in which this starch is used in India as an article of food, nor as to the methods adopted in its

1999 Hats. 2000 FOOD. Sago. 2001 Sago Palm; the Coscinium

COSCINIUM fenestratum.

WOOD

2002

preparation Knox says of Ceylon that the people "beat it in mortars to flour, and bake cakes of jt, which taste much like white bread, it serves them instead of corn before their harvest is ripe"

Structure of the Wood —Soft, with a hard rind composed of black vascular bundes. The vascular bundles in the centre of the stem are soft Roxburgh remarks "I do not find that the wood is put to any useful

purpose "

The tree often grows to a great size before flowering; one whose measurements were given in the Indian Agriculturist for November 1873 as flowering at Peradeniya, Ceylon, measured height of stem 84 eet, of flower panicle 21 feet, total 105 feet, girth at 3 feet from the ground round the persistent bases of the leaves 13 feet 9 inches, at 21 feet from the ground 8 feet 3 inches, age about 40 years. The leaves are very large, often 10 to 16 feet in diameter.

DOMESTIC Beads 2003

A considerable trade is done in these nuts from Bombay, the supply coming apparently from North Kanara and Ceylon. They are sold at R20 to R25 per candy of 616th. They are also sometimes coloured red and sold as coral, or are made into small bowls and other ornaments. In Furope they are now largely employed in the manufacture of buttons. The trade in these nuts is, thefir carried on by Arab.

Ornaments. 2004 Buttons 2005 2006

2007

# Corypha Taliera, Roxb ; Cor. Pl , 1 255

A closely allied species to the preceding, which bears most of the vertacular names given above, and is put to the same industrial purposes, is a native of the north-eastern coast of Madria, especially in Coroman del A third species may here be mentioned by name C. elata, Razk, Fl. Ind., 208, a stately palm and native of Bengal, where it is known as bajar, but Roxburgh views C imbraculfera as the intermediate form between Tallera and elata, so that even if future botanists continue to view all three as distinct species, for industrial purposes, they may be regarded as but forms of one plant. It would, indeed, be impressible to separate under these plants the various properties assigned to them.

# COSCINIUM, Colebr , Gen Pl , I , 35

[Menispermace# Coscinium fenestratum, Colebrooke; Fl Br Ind, Vol I, 99,

> Vern — Thár ki haldı or jhadı haladı, Dec , Haldı gach, Beng , Mara manyal, lam ; Vlánu pasupu Tel , Marada oris'inna, Kan , Darvi (Ainslie), daru-harjarkam (Moodeen Sheriff) 'hans , Venwell, Sing References — Vorgi, Hort Sub Cal , 332, Thwaites, En Coylon Pl , 12,

Habitat.—An extensive climber, met with in the forests of the Western Peninsula, and distributed to Ceylon and the Straits

### COSCINIUM fenestratum

#### The Coscinium.

2008

Dye — In Dr. U. C. Dutt's Materia Medica of the Hindus, Darvi is given as the Sanskrit for Berberis, sp. Neither Brandis nor Gamble record that name, nor an nor is it so given

hand, gives Dar

Cosemism and Berberis yield a yellow dye; are valuable medicines; and the chips of the wood, but for structural peculiarities, could not be distinguished. Ainsile apparently was labouring under one mistake; he took the Maramanjal, Tam, as different from the Vinivel-getta, Ceylon specimens of which were sent to Roxburgh for identification. General Macdowall viewed the Ceylon specimens of this species as Colomba root, but Roxburgh corrected him. Speaking of Mara manjal Ainsile says, "it is sometimes used as a yellow dye," but this was apparently unknown to Roxburgh.

Dr. Bidde remarks: "This wood contains much colouring matter, akin in properties to that of turmeric," hence the name jr.kn.halds or the properties author says of ted from Kolafollows: "The

MEDICINE Root 2000

circumference, employed in preparing certain cooling liniments for the head, and is also used as a yellow dye; it is brought from the mountains, but I have endeavoured in van to ascertain the plant." At present the root is extensively used in the hospitals of the Madras Presidency as an efficient butter tonic. A writer quoted by Christie gays of Ceylon that this root is viewed as "a very good substitute for Calimba. I have used it

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with),
id stonittent
states

the doses aristata.

The drug is sometimes sold as calumba root or for berberry, iron which it may easily enough be the wood Bright, greenish ye devoid of concentric rings, but having the concentric rings, but having the concentric rings of the concentric rings.

translation of many of the

is also stomachie" (Surgeon-frei) "Used also in Cases of suppression of takin (Surgeon-frei) J. L. Ratton, M.D., M.C.,

2011

2010

C. 2011

### The Cartas

COSTUS

Salem) "This has been in use for some years in the horp tal and found to be a fairly useful medicine in certain cases of dyspeps. I think it a fairly good substitute for calumba. It has been used in the firm of powder and infus on Preparations Ac.—The same as culumba."

(Apoliceary 7, 6 Airmorth, in Hedical charge, Aumbalonam)
Trade—The root is sold in Madras at Rif per maund, and retailed it 2 annas a pound. There are no foreign exports of the root from Irda but it may be had in every large bazar throughout the country, so that there must be a considerable local demand.

TRADE 2012

2013

Cosmetic Bark, see Murraya exetica, Linn.

COSTUS, Linn. ; Gen Pl. 111. 646.

Costus arabicus, see Sanssores Lappa and hypoleuca; Comrosira

C. Speciosus, Ser , Wight, Ic, 2014, SCITAMINEA.

la.

Vern - Kitt led Beng, Hind; Orch Santal; Guddeichddin la lemala; Bing, Pennga penna, Mar Bemmadachile, Fri. It annahm Mal; Keyn, keoli kutiririn (1701). N. P.; Kemala Sina, Ber W. Elliot gress the following as Santa e synonyms. Publica amilaka andkasmire.)

from the foll own; as Sunk responsive Packlers mulational learning yells Since (1997). The Since (1997) is the Since (1997) is the Since (1997) is the seems to be the Tjanakan of Rheede, Par XI, is ff; the Tsana specious, Gracium, IV; and the Hebba spatials historia of Rumph, Amb. 11, is ff eff.

References—Rode, R. Jud. 2d. C. B. C., 25 Verst Host Suk. Car.

sures Lappa, but heat adea to Costus specious as a name of Sack India, Cochech na, the M locase, and Sanka hands.

Babitat.—One of the mot elevant plants of the family clies and also

Institute—One of the more repair; partie of it from by rising as me whisted a concerning flows forces and which have a shone the Annia wind in the Indian trivial fungles. It is common extendible the against the contrast of each trivial in the contrast of each trivial in the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the contrast of the endiant the endiant the end

Perfumery Piesse says o t "I have my to a ne ex, or men a a ! a sample of soilt, it as was a lie mair ; and co ras Ores Roe Thet nettre las an agreed care a dwood be us to the gare In a set been wen in ear makets ' An a . " dique ey a ze es hem it te expreed tum Brgal weren e et mate to te this courte ore the gertuners of bur or Teris an 100 Lowere, that Pieses in sect , to the fat of Saussura Lama ce 5 tropo turn in embres at the Constant and a time free rest that and a Costus I a term as a citing of the sea and a firm of Costis lest il we will be not per at any have to a " serra estitute quantitute for a fat at a serve was effective to the serve was a fat a serve to the organization of the serve as a serve as Inta a s i Comus apecicaus than t Sassaures 7 --- 2 elibel verre, the lamboure the representation that the annual with the strate I to I'd a stand ever have don'ted I had bee an

PETERETY. 2012 

# COSCINIUM

#### The Coscinium.

DYE 2008 Dye — In Dr. U. C. Butt's Materia Mateia of the Hindus, Daroi is given as the Sanskrit for Berberis, sp. Neither Brandis nor Gamble record that name, nor any apparent derivatives from it to the species of Berberis, nor is it so given apparently by any other author. Ainsile, on the other hand, gives Darvi as the Sanskrit for Coscinium fenestratum. Both Coscinium and Berberis yield a yellow dye; are valuable medicines; and the chips of the wood, but for structural peculiarities, could not be distinguished. Ainsile apparently was labouring under one mistake; he took the Maramanjal, Isas, as different from the Finnest-getta, Ceylon specimens of which were sent to Roxburgh for identification General this species as Colomba root, Maramanjal Ainsile says,

to Roxburgh.

Dr. Blûte remarks: "This wood contains much colouring matter, as in proporties to that of turmenc," hence the name j. ki. hald! or ghach hald!. Dr. McOann, and also "to this dye as closely resembling tu the Chutagong district that the bark! dyne in Arracan. The use of this dyebark should be scraped so as to clean t. It is then broken up and steeped

MEDICINE Root 2009 also be combined with turmenc and other dye-stulls.

Medicine.—Alinshe says: "Mara-mangalis the Tamil name of a round, pellow-coloured, bitterish root, common in the bazar, about one inch in circumference, employed in preparing certain cooling liniments for the head, and is also used as a yellow dye; it is brought from the mountains, but I have endeavoured in vain to ascertain the plant." At present the

Ceylon that this
I have used it
has also antiessing wounds
teria Medica of
e author with],

teria Medica of e author with, ent

this was apparently unknown

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2010 aristata.

that it may

The drug is sometimes sold as calumba root or for betrutty, its which it may eastly enough be distinguished by the peculiar structure of the wood Bright, greenish yellow, with open porous structure, devoid of concentric rings, but having pronounced medulary rays it is, besides, and the structure of the structur

t is sometimes mentioned in the drug sales of Lurope as False Calumbia or Iree Turmeric, the latter being literally a translation of many of the vernacular names of the plant.

" It is also storrachie" (Surgeon-Madrii) "Used also in cases "J. J. L. Ratton, M.D., M.C.,

20I t

The Costus.	COSTUS speciosus.
Salem) "This has been in use for some years in the hosp tal and found to be a fairly useful medicine in certain cases of dyspers 1. It is it a fairly good substitute for calumba. It has been used in the form of poader and infusion. Preparations, &c.—The same as calumba." (Apotheory J. G. Attworth, in Hedical charge, Kambidonam)  Trade—The root is sold in Madras at Rij per maund, and retailed at annus a pound. There are no foreign exports of the root from Irda but it may be had in every large bazar throughout the country, so that there must be a considerable local demand.	TRADF. 2012
Cosmetic Bark, see Murraya exotica, Linn.	
COSTUS, Linn.; Gen Pl., III., 646.	
Costus arabicus, see Saussirea Lappa and hypoleica; Composities C. speciosus, Sm.; Wight, Ic., 2014; Scitanines.	2013

COSTUS speciosus	The Costus.
2015	desirable to leave the available information in its present form, since it by no means established that Costus speciosus is not used as a substitut for Saussurea.  6 "Please's remarks must and a Address's Saussurea, not to roots are quite into
MEDICINE. Tubers. 2016	Medicine.—The Costas or lust root is given as a depurative an aphrodistae. But whether or not the lust root should be always viewed as Saussurea there seems no doubt but that a certain amount of the state of Costas and Costas areas and costas areas areas and costas areas
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	root a strengthening tonic is made, and it is also used as an anthelminitic."  The Revt. A Company of the strength of the stre
	writer an C
	root is d attribute tions." ?
	the genci
	of the dra for some unexplanable reason the roots of these plants have been con- no resemblance
	ime time there
	from any idea of adulteration with the supposed Costus of the ancients.  Sir Walter Elliot gives several Sanskrit synonyms for Costus specious. He may have been mistaken as to these synonyms, but he clearly recognised what the Costus specious of botanists meant, as he describes the plant. He refers to Residency's Flora Indica, Vol., I, p. 50, and to the Coromandel plants, page 126, and states that while Roxburgh in these and are the plant of the Tolke for Younghas recomm
1	"in '
•	whic Puss
	(Wi
1	to C
2005	for t from Kashmir the confusion between Costus and Saussurea might be re- garded as rendered doubly perplexing. Irvine, in his Materia Medica of Pattan, say of what he calls Costus arabicus that it "differs wholly from the real Kiti or Patchuk". He adds that it is the root of a plant found near water and is (say) used in massalas, modorous, and tastless." Here there seems no reason to doubt we have an allusion to Costus and not to Saussures.
FOOD. Tubers.	Food The tuber is cooked in surum and made into preserve in some
2017 Sweetmeats	parts of India; the natives consider it wholesome. This information regarding India was first published by Roxburgh, but Ainstie drew
2018	attention to the fact that in Brown's Hortus Jamaic, Vol. 11. p. 281,

C. 2018

Cotula or Babuna: Alpine Stocks

COTULA anthemoides.

the root stock is said to be used as a substitute for ganger. Or Dymock, commenting on this streement, remarks. "The rhizome resembles the great Gilingal in growth and structure, but has no aromatic properties, the taste being muchiginous and feebly astringent; it could only be used as substitute for ganger by being preserved with a quantity of that root sufficient to flavour it." The Revd A. Campbell says the root is eaten by the Santals.

COTONEASTER, Medik, Gen Pl, I, 627

Cotoneaster acuminata, Lindl, Fl Br Ind, Vol II, 385,

Vern -Rid, rduns, rins, ruinish, HIND

2019

References -Brandis, For Fl , 209, Gamble, Man Timb , 171.

Habitat.-A deciduous shrub of the Himaliya, from the Beas to Sik-

kim, and occurring between 4,500 and 13,000 feet

Structure of the Wood.—Hard, like that of C. bacillaris, used for walking sticks.

W00D 2020 2021

C. bacıllaris, Wall, Fl Br Ind, Vol II, 384

Veru.—Ri, ris, lin, lins Ishan, Ehers, lani, réu, resis, rest, rish, sichs, Ihroa Eherbaba, Pa Hills; Ruinsh, Juunaan Buwun, Sichs, jalidar, Sart Rance, Launs, Kancas, Aharek, Pasiitu References—Pirandis, For Fl., 757, Camble, Jian Timb, 171, Siemari,

Pb Pl, 79; Indian Forester, 1855, M, p 3, Ampra Gas, 30

Habitat. — A small deciduous tree of the Salt Range, above 1,500 feet, of the North-West Himálaya from the India to the Sarda, between 5,000

W00D.

and to 000 feet, and of Sikkim and Bhután
Streature of the Wood —White, turning light-red towards the centre,
smooth, very hard, close and even grained, but splits and warps much
Used for making walkingstucks, the "Alpen stocks" sold at Simila are
usually made of this wood, and there is a considerable trade done in exporting it to the plains from many points along the Himalaya This is
the Cotoneaster obtusa alluded to in the Settlement Report of the Simila
district, in which it is said the hill tribes use the sticks as goads (chunta)
The larger pieces are made into jampan poles, axe handles, &c Baden
Powell surgergests that it is suitable for turning

C. microphylla, Wall, Fl Br Ind, II, 385

2023

the fruit is also sweet

Fruit

Cotton and Cotton Manufactures, see the article Gossypum in

2024

COTULA, Linn, Gen Pl, II, 428.

2025

Cotula anthemoides, Linn, Fl Br Ind, III, 316, Composite Vern,—Babuna, PB HIND

CRAMBE cordifolia	The Cow Tree
	Bah'sab a gan'll bast and a rion to -1' - the Gangetic plain, fro
MCDICINE. Flowers. 2026	babana, which is herte &c. Compare with A:
	most diseases of the ey
	Country Borage, see Coleus aromaticus, Benth.; Labrate.
	Cotyledon laciniata, Rozb.; see Kalanche faciniata, DC.
	COUSINIA, Cast.; Gen. Pl., II., 467.
2027	Cousinia mlnuta, Boin.; Fl. Br. Ind., 359; Compositie.
	Syn.—C. Calcitrapiformis, Janb & Spach., C. avalevsis, Bunge. Vert.—Labhes, poli landierl, or landierl, Pv. Reference.—Stewart, Pv. II., 125.
	Habitat.—A small rigid herb, found in a wild state in some parts of the Western Panjáb plains, and distributed to Afghánistan, Baluchistan, and Persia.
raap. 2028	Food.—The young plant is used as a vegetable in the Salt range (Stewart).
	Covellia glomerata, see Ficas glomerata, Rovb.; URTICACER.
	Cow-itch or Cowhage, see Mucuna pruriens, DC.; LEGUMINOSE.
	Cowrie, Kawrie or Cowdie Pine, commercial name for Dammara australis, see under Dammar, Hopea, and also Canarium, C. 273.
	Cowrie or Cowry, see Shells, also Beads, B. 380.
2029	first to draw special attention. It is a member of the preduction in the preduction in the first to draw special attention. It is a member of the preduction in the first to draw special fruitless efforts have been made to introduce this
	plant into India, see the Indian Forester, IX., 517.
	Crab's Eye, see Melia Azedarach; also Abrus precatorius, A. 73.
}	Crab Tree, see Pyrus Malus, Linn., Rosacez.
(	Crabs, see Crustacea.
Į.	CRAMBE, Linn.; Gen. Pl., I., 98.
2030	Crambe cordifolia, Stev.; Fl. Br. Ind., I., 165; CRUCIFERE.  Habitat.—A tall herbaceous annual, with leaves nearly a foot in diameter. Frequent in the North-West Himáloya, Quetta, Western
F00D 2031	caten as a pot-herb

	00 4 m ====
Hawthorn: The Bel Fruit of some Writers.	religiosa.
CRATÆGUS, Linn.; Gen. Pl., I, 626.	1
Cratægus Clarkei, Hook. f; Fl. Br. Ind, II, 384; ROSACEE	2032
A species of hawthorn met with in Kashmír, which may be viewed as intermediate in type between the two following species	2033
C. crenulata, Roxb.; Fl Br. Ind., Vol II., 384.  THE HIMALAYAN WHITE THORN.  Syn — C Pyracantha, Persoon; Mespilus crenulata, Don.	55
Vem — Gingaru, giantu, Hind , Gengaru, Pa. Re. Re. Dala & Gibs , Drury, U. Pl.,	
Habitat —A large spinescent surus of the riminal, irom the Sutlej to Bhután, found at alutudes from 5,000 to 8,000 feet, but in Kumáon at 2,500 feet	
Structure of the Wood —White, hard, very close and even-grained, used as axe handles, staves, &c	W00D 2034
C. Oxyacantha, Linn., Fl. Br. Ind, II, 383.  THE HAWTHORN.	2035
Vetu —Ring, ringo, ramnia, pingydi, or pinydi, phinddi, patákhan, ban-sanji, sursinji, or sinji, PB HIMALAYAS, Ghwansa, or ghwardsa, TRANS HOUS, Durdna, Arch	
Habitat.—A small tree (20-30 feet), met with in the North-West	
edible PRUIT "which is " (Brondis). "On the	FOOD. Flowers
Chenáb, particularly, the fruit is large and really decent eating" (Stewart).  Structure of the Wood.—Hard and durable, used for the same purposes as the preceding.	2036 Fruit 2037 Wood, 2038
CRATÆVA, Linn; Gen Pl, I, 110	2030
Cratæva religiosa, Forst , Fl Br Ind., Vol I., 172; CAPPARIDER	2039
Syn.—Capparis trifoliata, Roeb; C Rorburguit, Ham; C Nur- Vala, Ham Veru—Barna, barun, bilásı, bila, bilana, Ilind); Barún, tiklo-shat, Berg; Taidalu, bunboronda, Mechi, Purbong, Luvcila, Barna, barndili, Pa, Ral, Bela, bel, C. P; Váyntarná, bildavarná, hida- varna, kunla, morran, larvan, Ilona, Kunda, karran, Mar, Mara- lingam, sin sutit manu, ulimid, uramda, vala, sin sutit, tali, Tel., Nurjanu, Cooko, Kadet, kala, Ilona i, Varna, ama- righa, Sans Roxburgh says that it is the Tikla-shaka of Samkirt witters	
History — L.  Egle Marmeles Crateva Marm the same verna nness and in D. R.	111STORY. 2040
C. 2040	

CRATÆVA religiosa. Forms of Cratmya

VARIFTIES

Leaves

2043

Bark

2044

Fruits

2045

Roxburgh. Dalrell and Gibson say it is common on the banks of the Nerbuddas Roxburgh, that it is

"the latter name, as he explains,

being due to the fruit having "a strong smell of garlie, which it commu-

ten-spoonful twice or thrice duly, " Sir Walter Elliot alludes to this form in his Flora Andheica (pp. 180, 185, 18), and gives it the Telegra

names of alimids, anks many, tella-alimids.

It may be worth pointing out that it is the leaves of variety Narvala

day an are of the substructed properties of the leaves of variety Roxsurghia.

day an are of the ruber eccent properties of the leaves of variety Noscoughli. He stues, however, that in Jimica, where that form also grows, "Braham says, the fruit is cooling, and the leaves are applied externally to take away inflammations about the anus, and also for the car-tache" Of another Jimica species, C gynandra, he says "that the root blisters like canthrates".

These facts are of the greatest importance, in the confirmation which they afford to the opinions, expressed on a further page, by Dr. Moodben Sheriff as to the rubefacient properties of the leaves It would be to both forms

actucle on "Cratæva :...

account of Egle Marmelos, and again, in the 2nd paragraph of his
article on "Cratæva religiosa," refers to a resin found within the fruits,
which he regards as of great value "in cleaning foul ulcers". It is also used,

i (around the seeds)
r, it is stated that
the motion to form a

th morter to form a how many different clants as Ægle and

Cratæva becomes possible

Gum and Dye — "Anthison states that at Jhelum the fruit is mixed mortar to form a strong cement, and the rind as a mordant in dyeing " (Stewart)

Medicine —From what has been said it may be inferred that some doubt still exists as to whether the medicinal products of Cratieva can be spoken of as afforded by the one species or two species. The writer must

Cement

MORDANT 2047 MEDICINE.

A name which does not appear now to be in use in flindustan, although mentioned by the older writers

The Nurvala

CRATÆVA religiosa.

> MEDICINE. Bark 2048 Leaves, 2049

common complaint of a somewhat obscure nature. The leaf-juice is given in rheumatism in the Concan in doses of 1 to 3 tolas, mixed with cocoa-nut juice and ghi In caries of the bones of the nose the leaf is Fomentation. smoked and the smoke exhaled through the nose. The bark and the leaf

Juice. 2051

urinary organs" (U. C Dutt) Irvine (Mat Med, Patna, p 128) says of the barun, Cratæva Tapia: "The fruit and bark are used in embrocations in rheumatism; not given internally." In the Manual of Trichinopoly (p 77), it is stated of "Cratzva (nurvala) religiosa" the "Mari-lingar, TAN," that "the leaves, bark, and roots are used medicinally" But the most complete account of the medicinal virtues of Cratæva will shortly appear in Dr. Moodeen Sheriff's Materia Medica of Madras, That author says. "The bark is sold in some large bazars of India, not the leaves and root-bark," -'0- ---

The bark is also useful in some cases of urinary complaints and fever, and in some mild forms of skin diseases in which sarsaparilla is generally resorted to. It also relieves vomiting and symptoms of

use. The plant grows well with ordinary care "The fresh root-bark is also a very good rubefacient and vesicant, but it is rather too dear and not procurable in large quantities" (Moodeen Sheriff, Khan Bahadur, Honorary Surgeon, Triplicane Dispensary, Madras).

Food. The PRUIT is said to be sometimes eaten (C. P. Gaz. 59)
Structure of the Wood - Yellowish white, when old turning lightbrown, moderately hard, even-grained. Used for drums, models, writingboards, combs, and in turnery In Trichinopoly it is also used "for making planks and as firewood."

	• • • • • • • • • • • • • • • • • • • •
CRINUM pratense.	Toxicarium→a useful Emetic.
MEDICINE Boot. 2005	for the ear-ache in Upper India. In Java, by Horsfield's account, this plant is reckoned one of the most satisfactory emetics the inhabitants have."
Extract 2066	phoretic; we have never known it to occasion any untoward symptoms. The dried sliced roots are also an efficient emetic, but require to be given in double the dose of the recent article." The extract, whether watery or alcoholic, is very uncertain in its action. In the form of a syrup it may probably be found to retain the native principles of the recent plant. The tincture of the fresh plant does not succeed, doubtless in consequence of the large quantity of spirit counteracting the emetic effect by its stimulating energy.  These two passages express all that has since appeared, as, for example, in the Pharmacopaia of India; Drury, Murray, K. L. De, and indeed most subsequent writers, repeat in other sentences the same facts. Dr. Dymock adds: "I have not met with any account of this drug in native works on
Bulb.	slightly roasted, and the juice is then expressed and a few drops poured into the ear."  The bulb of the so-called Crimum asiatrom is made officinal in the
2067	Indian Pharmacoputa as an emetic, nauscant, and diaphoretic Special Opinion ( "Ph. ) ing effect in cases ( J. Anderson, M.B. mattons" (Dr. H. )
2068	Crinum defixum, Ker. (and of Gatul); Herbert, p. 255; Bot. Mag.,  Syn.—C. Asiaticum, Read (non Linn.), Fi. Ind., Ed. C. B.C., 233; C. Roxungouti, Dals, P. Bomb., 275; Buturta Poula Talv., Rheede, XI., t. 33; Radix Toxicaria Secutos, Rumph. VI., 159. Vett.—Suk-darthen, Bevo., Nagdown, Bosns.; Reser cheftu, Tel., Hintolabo, Sino (according to Ainshe). References.—Dals & Gibs, Bomb Fi., 75; Libba, U. Pl. Bomb, 204 Habitat.—A native of the Concan, of Coromandel, and of many parts of Bengal, as, for example, the Sunderbands. Flowers large, sessile, white, fragrant during night; flowering time, the close of the rainy season. Dalzell and Gibson say it is common on the banks of the Deccan rivers. It delights in swampy situations where mud abounds.
MEDICINE 2069	Sections of the section of the secti
2076	C. pratense, Herbert; Amaryll, 256.  Syn.—C. Lovoipolius, Rozb, Fl. Ind, Ed. C.B.C., 252, C. Lauripolius, Herbert & Rozb; C. Leigans, Venustum, and Canalifolius, Carp., Ven.—Po-daing, Burn. References.—Voigt, Hort Sub. Cal., 590; Bot Mag., t. 2522 and 2121.
	C. 2070

### CBOCODITIES The Common Crocodile nalustris Habitat .- A native of the interior of Bengal, Sulhet, Pegu &c., flowering time the rainy season. Flowers large, white, fragrant. A variable plant, some of the names given above belonging to what may prove remore elegant but does not 2071 species (Roxb). The form C. Jaumfolum occurs in Permi it has very long weak recumbent leaves (2 inches by 5 feet). Crinum. sp. (found in Chutia Nagpur.) 2072 Mr. C. B. Clarke writes of this plant that he is unable to name it, and 5. . A C

Vesu. - Sikyom baha, SANTAL Habitat .- High and dry situations in Chutia Nagpur, flowering during the hot season before the leaves appear. In some respects, this resembles C. latifolium as described in Roxburgh's Flora Indica.

Medicine .- Mr. A. Campbell says. " The bulb is sometimes as large as a good-sized turnip, and of the same shape. A decoction prepared from it is given internally and pounded and made into a paste; it is also applied externally by the Santals in dropsy. It is used for the diarrhea of cattle

C. zeylanicum, Linn ; Wight, Ic. 2019-20

Syn.-C ORNATUM, Herbert, C. ZEYLANICUM, Roxb , C. LATIFOLIUM, Roxb, C. MOLUCCANUM, Roxb, C. HERBERTIANUM, Herb, p 203; also Wall, Pl As Rar, 2, p 145 Vern -Sukh-darsan, Beng, Gadambikanda, Bons; Goda-manil,

Sina Re's .---

Habitat. - A very variable plant, some of the above synonyms corresounding to well marked varieties, which, in a work on economic products, th gafety he treated collect sel

flowers in April, is stemiess, and has a spherical build often 2 feet in circumletence.

Medicine .- Dymock remarks of this species: "The bulb is extremely actid, and is used for blistering cattle, a slice being bound upon the skin. When roasted it is used as a rubefacient in rheumatism "

CROCODILE (CROCODILUS, Cur)

Crocodilus palustris, Lin.

THE CORROY CROCODILE, of en vulgarly called in Ind.a, the Alligator-an American Repule,

C. 2077

2073

MEDICINE.

2074

2075

MEDICINE.

Buib 2076

	Dictionary of the economic		
CROCUS sativus.	The Crocodile; Saffron.		
	There are apparently two other species besides the above met wit india, sus, C. porosus, Schneid, and C. tingonops, Gray Thelong snot Gavail lives on fish and turiles, and frequents the rivers of India along with Crocodile.		
	Vern Magr, kumhir, Hind.; Sisan, Sind.		
	Habitat.—Found throughout India and Ceylon, affecting rivers, lakes marshes, and even the sea coast. It may be recognised by its shorter and broader snout than that of the Gavail, and by the first and the fourth tooth of the lower jaw fitting into the upper.  Although held sacred in many parts of India (and sometimes even tamed so far as to come for food when called, as, for example, at the Alug-		
	ger Pier), the Crocodile is the terror of the rural inhabitants of India along the basins of the great rivers, not even the stakes placed around bathing places proving an effectual protection. The Crocodile often attains a great size, being from 15 to 30 feet in length, and although it is reported to eat the dead bodies thrown into the rivers, it lives mostly on live to the dead bodies thrown into the rivers, it lives mostly on live		
2078	said to be eaten or		
2079 2080	(' : ear to regularly Friract : alson, in his Industrial this substance procured		
5081	dile contains a larger any fish-oil. It is prepared by the Same time, in the Panjau, who can crocodile flesh, and is also said to be procurable in abundance at Agra (Spont Encyclop, 5136).		
2032	CROCUS, Linn; Gen Pl., III, 693		
	This is the sporor of Dioscorrides. It is not alluded to by the earlier Sanskint writers, but Arabian authors speck of it as cultivated in the both century at Darband and Ispahan, and Chinese writers state that it was introduced into their country by this Michamandana on the Yuna deposity (A. C. 1280).		
2083	Crocus sativus, Linn.; Royle, Ill. Him. Bot., t. 90; IRIDER. SAFFRON.		
	Vern.—Jöfeán, Beng, Klear, asfron, Hinn; Safran, keisar, kecara, Bosti, Kreara, Mari, Kehar, Gut, Kunkuma, Kaimfajanna (Anistic), havibana (Dutt), saurab (Dymock), Sass; Zaafran, Arab Frri, Kungumah, Tak Kunkum apuer Tet; Tkansad, (Mr. Oliver, Foera) Oliver, Barna, inform the writer that this with name for Tormete not Saffron. The word appears in amount works under Saffron and is threefore given have for the cornect to Atthiban). Kashinin, Kurkum, Biotre, Zafar, Torke (according to Atthiban). References.—Do. Org. Cult. Pl. 1º. Thom. Ind., 315; Annie, Mat. Ind., 354; O Sanagharey, Eng. Distan. Ind., 315; Annie, Serf, Jag. Param. Ind., 318; U. Sangharey, Eng. (18th. Mrd. Hind., 304). Serf, Jag. Param. Ind., 318; U. Sangharey, Serf, Safa, Safara, J. Januar, Ind., 318; Juraa, J. 181; Juraa, Jura		

Saffron; Indian Crops	CROPS.				
Habitat.—The European supply of this plant comes from France,	SAFFRON.				
	ı				
known as Kesar-ki-rote.	DYE. 2084				
	MEDICINE. 2085				
(Dr Emerson) In over-doses it is generally reported to act as a nar- cotic poison. Ainsile gives perhaps the most complete account of the native uses of this drug, and of the opinions which prevailed among	2086				
The property of the second					
torus)  Chemistry.—§ "The colour of saffron is due to the presence of a glucoside polychroti, which is decomposed by acids, with the formation of a new colouring principle Crosin" (Prof Warden, Calcutta) For full particulars as to the chemistry of this drug see the Pharmacographia, p. 666.	CHEMISTRY. 2087				
Trade in Saffron — The imports of foreign saffron were in 1882-83, 226 cwt. valued at R4.25.124, and in 1886-87, 268 cwt. valued at R5.50,383. Of the Indian imports the bulk comes from France.	trade 2088				
CROPS.	2089				
pr th					
gradation exists in which the tendency to extreme humidity or extreme aridity modifies the general character. From this point of view alone India may be said to be capable of producing the crops of the arctic, the temperate, or the tropical regions, or of the deserts and swamps of the world. But superadded to geographical peculiarities, it possesses soils					

sometimes to the raintens a year. I mis is modified in certain provinces through the rains not occurring at the same period. Thus, in Bengal, Bombay, the greater part of the Central Provinces, and in Berar, the rains

2 Q

CROPS.	Indian Crops,	
:	occur in June, July, August, and September, being preceded by the hot season, and followed by the cold. In the Panjab, while rain fulls during those months, it is not so heavy as in December, January, and February. Rain during March in the Panjab and North-West Provinces would be most injurious. The Panjab, North-West Provinces, and Raputana have two seasons of rain—July, August, and September, and again December, January, and February. In Modern while the season as in not obtain it the commencement of the rains in Madras is the truest indication of the	
	close of the rainy season of Northern India. Western Rajoutana, a large portion of Sind, and the Southern Panjúb, have no regular rains, and are collectively often spoken of as the rainless area of India. It will thus be seen that to study the crops of India, the closest attention must be paid to this shifting of the crops of India, the closest attention must be paid to this shifting of the crops of India, the closest attention must be paid to	
	In the regior marked crops The temperate snow during	
	and his for the extense of a mid-common to part - the mid-common to any	
	India), the winter temperature is such that temperate annual crops may be raised. The following may be given as a brief classification of the chief crops, but fuller particulars will be found regarding each in its alphabetical place in this work.	
2090	111, CPRBALS — This includes Wheat, Rice, Oats, Barley, Indian-corn, Millets (various kinds), and Corv (Job's tears). (Conf. with Cereals) 2nd, PULSES.—Such as Gram, Peas, Beans, Lentils, &c. (Conf. with	
2002	Pulses) 3rd, Other Grains —Buckwheat, Amrantus, Chenopodium, &c This practically embraces all seeds which are ground into flour or eaten boiled	
	as a staple article of diet, but which do not belong to the GRAMINERS (Cereals), or to the LEGUMINOSE (Pulses). (Conf with Grains)  4th, SPICTS AND CONDIMENTS—Turmeric, Ginger, Cumin, Coriander,	
2093	Caraway, Pepper, Betel-leaf, Capsicum, Cardamum, &c., &c. (Conf. with Spices.) 5th, Starches and Sugar — Sugar-cane, Arron-root, Sago, &c. (Conf.	
2094 }	with Starches \	
2095	oth, Garden Products and Vegetables —Potatoes, Yams, Colocasia, Cabbage, Gourds, Melons, Cucumbers, &c., &c. (Conf. with Vegetables) The above might be grouped as edible products, but there are other crops some of them of even great importance, such as—	
2096	7th, Fibres - Cotton, Silk, Jute, Sunn-hemp, and many others, the ng, after sunn-hemp, the next most im-	
2097	Al (Morinda tinctoria), Madder, &c.	
2098	ofth, NARCOTICS—Opium, Ganja, Tobacco, Tea, and Coffee (Conf. with the separate accounts of each of these products and with the article Narcotics)	
	C. 2098	

Crops : Sunn-Hemp.

CROTALARIA iuncea.

10th, OIL-SEFDS —Ground-nut, Rape, Mustard, Cotton-seed, Linseed, Opium-seed, Castor-oil, Gingelly or Sesame oil, &c. (Conf with Oils) .....

These are the principal crops of India, but the agriculturists have often other industries to occupy their attention, such as the collection of forest or jungle produce,—e.g., Lac, Cutch, Myrobalams, Wild silks, Gums

2099

# CROTALARIA, Gen. Pl , I , 479.

2100

Agenus of plants closely allied to the Broom, the generic name being derived from the Greek coorador (a castanet), in alliason to the rattling noise made by the loose seeds within the inflated pods. This same idea, according to Sir Walter Elliot, is implied by the Sanskit name Chanter arams

2101

### Crotalaria Burhia, Hamilt.; Fl. Br. Int , II , 66; LEGUMINOSE.

2101

Vetn.—Sis, sissái, meini, fola, khippi, bula, khep, khip, khif, bhala, bái láthia, kharsan kauriala, PB, Ghagari, MaR, Ghugharo, Guz., Drunne, Sind References—Dale, & Ch. Book Fr. C. Stoney Dl. Dl. ag., & 1

Rasputana Gas .30

aub aboutest and a section to the

Habitat.—A lon under-shrub, abundant in the sandy plains of Sind-Panjah, Rajputana, and Cambay, ascending to 4,000 feet in allitude. Fibre.—Is said by Mr. Baden Powell to 311d a good fibre for cordage, used, to some extent, in the Panjab in place of the Sunn-hemp (C, juncea) of other proximes

FIBRE, 2102 MEDICINE, Branches,

Medicine.—The branches and leaves are used as a cooling medicine Fodder.—The Rapputana Gazetteer states that the plant is much valued as a fodder.

2103 FODDER. 2104

### C. juncea, Linn ; Fl Br. Ind , II , 79

SUMM OF SUMM HEMP OF INDIAN HEMP, FALSE HEMP, BROWN HEMP, BOMBAY OF SALSETTE HEMP, WICKOO MAR (OF TRAVANCORE PLAN), JUBBILIPUR HEMP, &C., &C. 2104 2105

Syn.—C TENLIFOLIA, Fast

STM.— TENTIFOLIA, ACCO
VERTI—Son, Ionois, Isani (or sun, Ihon), Hind, Beno I Anid, Indid,
ASSAU; San, Ihad, Isani (or sun, Ihon), Hind, Bono I Anid, Indid
ASSAU; San, Ihad, Cite, Sin, Indipalma leg, Mar. San, Iee,
San, Sind, Dar, Sand, Cite, Sin, Indipalma leg, Mar. San, Iee,
The Company of the Company of the Company of the Company
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According to some writers the name Ambdi or embdi is, in Western India, given to this plant, but it seems probable that that name should be restricted to Hibiscus casinabins. Indeed, it has been found a flicult to arrive at any define tedea regarding the present area under sum-lemp cultuation from the fact that the above Hibiscus appears to be confused with it. In Bengal, and indeed in some parts of the N.-W. Prources, it

C. 2105

CROTA	TADIA
CRULA	CITICITY
junc	ea.

History of Sunn-Hemp

FIBRE.

"hemp" should ever have come to be applied to any but the true hemp plant, as, by this usage, widely dissimilar products have been almost hopelessly confused. The sunn is a bust closely allied to the English broom or the Indian ddl, while the ambari is a Hibiscus or cotton-looking plant with sharply-cut leaves not

yielding plants, in the comr

these three plants have little or nothing in common

References. - Roxb , Fl Ind , Ed C B C., 545; Voigt, Hort Sub Cal ,

111. 043 Smill, 114, 4 1, 1144 17 to 4 1, 00 1 , , 20

Agricultural Gasette, January 1874, 162 163.

Habitat.—The Flora of British India gives the habitat of this plant as "Plans from the Himálnya to Ceylon, but often planted for its fibre." The writer is not aware of Crotalaria juncea having been recorded as found in a wild state anywhere in India, although it may sometimes exist as an escape from cultivation Kurz says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma" "like wild says of C. juncea in Burma

scribes a form, C. tennifolia) ters, however,

familiar with the living plants, still affirm that C. juncea and C. tenulfolia are distinct. They seem at least to be cultivated recognisable states which,

nd the found ivated History of Sunn-Hemp

CROTALARIA juncea.

to this day, although as yet it has not been reported as found anywhere between these remotely detant regions. At the same time C, juncea is cultivated nore flees in every province of India, competing for popular lawy with Histories and the province of India, competing for popular lawy with Histories and the lawy of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of section of the Panjah and Sind of Sind Ones and Sind Ones a

# SUNN (or SAN) HEMP FIBRE.

Under the heading Cannabis sativa the suggestion has been offered that the Greek and the Latin cannabis may have been derived from the

2106

commerce. In the unmistakable references to hemp in Sanskrit, care is taken to associate with the plant qualifying and descriptive epithetis that convey the idea of the well-known narcotic properties of the plant. Even the Hebrew shesh, generally translated flav, is suggestive of intovication, and hence the possibility of its having been used for hemp rather than flav. DeCandolle has established very conclusively that a form of flax.

the fact that the root of the word "linen" did not exist in Europe prior to the period indicated, and he adds that it does not occur in the Aryan lan-

flax. Thus even the history of flax is in some instances involved with that of hemp, such names as sheth implying an intovicating power—a property of the hempen fibres possessed alone by Cannabis sativa. The sans fibres of the Sanskrit authors are Crotalians juncea (sum hemp), Hubiscus cannabinus (sanpát), and Cannabis sativa (true hemp of modern commerce). As already stated, there would seem to be every chance that the earliest writers allude under Sana to the fibre of Crotalana juncea, but that, as the true hemp became known, care was taken by subsequent authors to dis-

Kshauma 2107

# CROTALARIA

## History of Sunn-Hemo

FIBRE.

the name for grass-cloth, is worth of ---- for the kihaum; which convey

It was made. Thus um for attail made, the patta-eastram in all probability the sunn-hemp-made garment. Later writers speak of sans garments as being used as sackloth and worn as a mink of punishment or mortification. A prophecy in the Vishus Purant speaks with score of the Kahyaga (or iron) age as one of degeneration, "when the garments of

modern historic times remarkable that this seeing that, as far as sypum (cotton) is tri (Book II, 44) we have

Sacred Threads. 2108

sana has been carried, at the present day, to the extent of violating even

sant has been carried, at the present try, other extent of violating even this injunction. Lisboa (Bombay Useful Plants, p. 200) states. "It appears that Mand being a Brahmin, always tried to keep this distinction, and claimed superiority for his class. But, nowadays, the sacred threads of almost all the Hindus are made of cotton."

While Cannabis sativa is found at the present day in what appears to be a wild state over the greater in the latter and the state of th

while met with to-day almost exclusively under cultivation, would appear to be a native of India, and possibly also of Central Asia; many other species of the same genus are abundant wild plants. This fact, added to

should have lost all knowledge of the properties of a nure once in general which grows so freely, if in early times the even was as abundant as it is now. There

p ever having been used in comparatively modern times as a regular textile fibre, and with the exception of the limited

s a source of fibre, but

san-pát (Ribiscus canagricultural purposesme importance,—vis,
t produce fibre of any

ative.

We may conclude this brief historic review of the hemp plants by

giving the opinions that prevail regarding the origin of our word" hemp.

Cultivation of Sunn-Hemp.

CROTALARIA juncea.

Royle in his Fibrous Plants of India traces hemp from sana Speaking of sunn-hemp he says: "Its name, Shanapin or Janapa on the Madaras ide, is not very unlike Canapa, Humpa, Hempi, and Hanf. From these we derive our own name 'Hemp'." In Mysoreit is known as sanabu and i

my Vedi : C in a land of the l

CULTIVATION.

Sunn is grown by itself or at times is cultivated in strips or around the margins of fields. It is never cultivated as a mixed crop. Throughout India as a whole it is a kharf crop,—that is to say, it is sown about the commencement of the rains and cut at the end of September or beginning of October. It is thus off the ground to allow of being followed by a rabs crop in the same year. But in some parts of India there are two crops of sunn hemp. Thus in the Thina District of Bombay it is sown in November after the tree havest, and the stalks are pulled up by the root in March. "It is also sown as a rainy-season."

This system has prevailed in the control of th

This system has prevailed in years, for Dr. Hove, writing in years, for Dr. Hove, writing in thick and grew to the height I understand that it was sown grain had been gathered in?

In Khandesh it is sown in June and respect in October In Kolaba it is sown in November, after the rice is harvested, and the stalks are upnoted in March. In Kolhapur it is sown in August and harvested in December by being cut when the plants are full grown In Poona is sown in July and ripens in October In the Central Provinces and the North-West Provinces it is a kharry crop, being sown with the advent of the rains, but in Bengal it is sown a little earlier, nimely,—from the

me astonishment at, since "it now "Roxburgh says it is sown in Ben-August,—that is to say, towards the Agricultural Report of Bengal it is

Agricultural Report of Bengal it is

mean period of sowing is about the beginning of the rains for in June), sunn hemp may be sown in almost any month and occupies the soil for 41 to 5 months. This is an important feature in new of the possibility of securing a continuous supply of fresh fibre throughout the whole year, It remains to be ascertained, however, what effect his varying period of cultivation has on the quality and quantity of fibre produced indeed, it is probable that (as is the case with ince and other crops sown at two or more seasons each year) there may be different cultivated forms of the plant produced as the result of ancient cultivation. We are ignorant of this subject, and it seems desirable that a thorough investigation should be made. Although, as stated, everything points to sunn hemp being a

FIBRE.

CULTIVA-TION. 2100 CROTALARIA juncea.

Cultivation of Scan-Herry,

Cultivation of fibre, Soil

2110

native of India, it may be disabled if the plant has ever been found in a following life state. And the existence of distinct cultivated force might not only help to conform the opinions given of an ancient cultivation, but might also exhibite the superiority of certain crops were offers for testify purposes. To what extent the Institute Termilolla is cultivated is not known, still feel do we know from far it all rids the superior sunscherip referred to by writers on this subject.

Hature of the Soil recommended for Sorn hemp -It req res a light but not necessarily sich so I, and it cannot be grown on day. It is therefore sown on the ligh sardy lards less suited for the more inportant crops. This is the epition which prevails in Hergal, but Messra Duthle and Fuller, writing of the North-West Provinces, easy "Authorities differ as to whether a rich soil is recessarily required, and although there can be no doubt that feetility in the still is necessary to promote great luxurance in its regetation, jet it cannot be contested that san is will grow on poorer land than almost any oil or erop. One possible explanation of this may be in the theory that plants of this order " (the per family) "can assimilate nitrogen direct from the atmosphere, and are hence less dependent on the soil for nourishment; and another explanation may be deduced from the fact that its roots peretrate deeper than those of most other crops, and can hence draw supplier from a larger body of soil," At the same time the practical expenients performed at the Saidapet farm, Madras, tend to prove that the plant would not produce so much fibre on rich as on poor soil. Speaking of these experiments Mr Bonson says: " The seed germinated well, and the plants grew with great luxurance, but when they had reached the time for cutting, there was no fibre whatever in their stems. The soil of this plot was a sandy loam, and probably the high cultivation and watering were unfavourable to the production of fibre." A second experiment was performed, the seed being sown on "a light and very sandy loam, recently levelled." The land was manured with "12 loads or about 4 tons per acre" of horse-manure, and the results were most favourable Mysore Garetteer it is stated that the best soil for sinabn is the red or black used for rogs cultivation. Wisset remarks that clay soils are injurious, but that on a rich soil the fibre is of a coarser quality than that grown on dry high situations. On the other hand, Roxburgh, while speaking of the cultivation in the Northern Circars, sais it (this may be C tenuiolia) is sown towards the end of the rains (October or November), and that a

Resulton 2111 strong clayery soil suits it best.

Effects of Sunn Calibration and the Rotation of Crops Pursued—It is all but universally believed by the Indian cultivators that suin, like gram (see Cleer, C. No. 1067). Improves the soil. In the Bombahy Gastilter (Kolhapur District, p. 172) it is stated: "As it is supposed to refresh the exhausted soil, it is considered a good bevad or preparatory crop, and is grown as such every second or third year in some of the helds required for sugar-cane, tobacco, and other rich crops. Sometimes it is sown as a second crop and ploughed in when young as a green manure." From Poona it is reported that the Serves are considered "excellent manure." In gardens and occasionally in dry-crop lands it is grown solely for manure, the plants being ploughed into the soil when ready to flower." The Director of Agriculture in Bengal states: "It is considered by the people of the Lower Provinces to be a renovating crop, and is sometimes used as a green manure to enrich poor paddy land, and in that has been infested with weeds" He adds "It comes after one of the pulses or mustard, and is followed by a pulse, sometimes by sharm omors. When sum is grown on good soil, it is sometimes followed by postates. It is not necessary to prepare the land well for sum. Three or four

Cultivation of Sunn-Hemp.

CROTALARIA iuncea.

ploughings are sufficient." . . . "Sometimes also paddy and sunn seeds are sown together in the same field. When the plants have properly grown, the field is lightly ploughed and the ladder (a kind of harrow) is passed over it. The paddy plants mostly recover themselves, but the tender and juicy sunn is buried underground and dies. A few sunn plants remaining are removed at the time of weeding and buried in the

CULTIVATION FIRRE.

Mosal's Lumb and Lunch say of the North Trees story own: 1 magn. ing in a green crop of hemp is known to add considerably to the fertility of the surface soil by increasing its stock of nitrogen, and it is extraordinary that this is not a general practice with native cultivators." In

> TREATMENT. 2112 Bombay. Bengal.

> > -W. Provin-

Madras.

pp. 238-39). Of Mysore it is stated: "It is allowed no manure; and the seed is sown broadcast on the ground, without any previous cultivation, at the season when the rains become what the natives call male.-that is to say, when they become heavy. After being sown the field is ploughed twice, once lengthwise and once across; but receives no further cultivation. At other times the sanabu is cultivated on rice ground

Mysore.

in the dry season, but it must then be watered from a canal or reservoir." Seed .- The amount of seed to the acre is variously stated. In the above passage from a report of experiments in Madras only 12th to the

acre were used but in the North Western Den incer Soft) to . an acr eighty

2113

## CROTALARIA juncea

## Production and Cost of Sunn-Hemo

CULTIVATION OF FIBRE Left standing for a month Steeped at once

may fall on the land " It is not clear whether the crop is left on its roots,that is to say, not reaped,—or whether it is cut and stacked on the fields—the latter more probably. The greatest difference of opinion prevails as to whether the cut crop should be dried before being steeped, or, like jute be

dry thes

water of the tank With regard to sunn hemp the general rule may be almost safely laid down that in moist regions like Bengal, rap d submer sion is preferred, and in dry regions, like Madras, stacking the crop is practised Roxh with f ... that "steeping

s of alk o op actice, that Compatore is supposed of an

Bengal during becomes weaken hand states th firet de not ha al a

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removed from bark till

ric au h'n co

PRODUCE

Fibre not

required

2115

640 lbs per acre

> COST 2116

Bombay hemp is 150 pounds. In the Madras experiments made at the Sa dapet farm the results were for plants in flower, cut level with the ground on the 4th December, 300lb pulled up by the roots on the same day 323th, on the 15th December, when the seed pods had partly matured, cut level with the ground 425lb, pulled up by the roots 4875lb, and on the 21th December, when the seeds were ripe, 4375lb. The average given by Wisset is thus most likely to be a high one and the Kolhapur returns incorrect Duthie and Fuller say of the North West Provinces "The average outturn is about 8 maunds (or 640lb) of clean fibre to an acre, worth about R20"

Madras districts to produce the finest sunn hemp

COST OF CULTIVATION AND LOCAL PRICE OF FIERF -- Messrs Duthie and Fuller give the cost of cultivation in the North West Provinces, includ

fit of R4 10 In the n acre, is given as Royle says "The

nuch as the plant requires scarcely any attention and consequently little labour or expense, and it may be off the ground in time to allow this to be prepared for any cold season crop. But the expenses and the profits are as variously stated cold season crop But the expenses and the profits are as variously stated as the produce The price is also given as varying from R1 8 and R1 12 to R3 per maund " Duth " Duth " The price is also given as varying from R1 8 and R1 12 to R3 per maund " Duth

say, R2-8 a maund, but fluctuations in late years that in 1877 its price was .

years back it stood at 20 seers The Calcutta price is about R5 a maund Dr Buchanan Hamilton describes two crops of s inn hemp as grown in his time in Mysore Of the one he remarks the seed is sown any time after the rains and rather thick, the quantity used being two bushels to the

#### Area under Sunn-Hemp.

CROTALARIA iuncea.

acre. The produce was a manufacturers by the t' fetched two rupees per ." half. But another crop. .

watered and more labour spent upon it, but the produce was more valuable. An acre, he says, required 4.2 bushels of seed, and its produce was

"old for about fit 2s 101d.

AREA UNDER SUNN-HEMP -As may be inferred from what has been stated regarding the ambiguity in the Indian literature of this subject, it is next to impossible to discover the extent of sunn-hemp cultivation Messrs. Duthie and Fuller, from special returns furnished for their Field and Garden Crops, state that in the North-West Provinces there are about 40,000 acres under the crop But in the Land Administration Report for 1885-86 (page 163 A) it is stated that there were 198,728 acres under "Sanas or Til (sic)" But it is further remarked that the total area under "fibres other than cotton and jute" was in that year only 123,403 This last return would include hemp (proper), sanai and Hibiseus cannabigus. The Settlement Reports of Oudh show about 800 acres under sanai. In Spons' Encyclopadia it is stated that there are 50,000 acres in the Paniab. It is not known from what source that statement was derived, but it seems highly improbable that there is more sum grown in the Panjab than in the North-Western Provinces The returns of the Panjab give about 40,000 acres under "hemp," but how much of that may be the true hemp plant, how much Hibiscus cannabinus, and what balance remains as sunn hemp, it is impossible to discover Last year there were 26 614 acres of brown hemp (Crotalaria juncea) grown in Bombay. Full particulars regarding Madras cannot be obtained, but of the districts for which returns are available there were list year 775 acres under "sunn" and 83 acres under "Bombay hemp" What this Bombay hemp may be cannot be learned, but in most works on the subject Bombay hemp is a sy nonym for sunn-hemp In 1884-85 there were 380 acres of "Bombay hemp," and in 1885-86, 330 acres, so that its cultivation would appear to be declining Of sunn cultivation in Combatore it is reported "It can be grown anywhere and to my extent if a demand is made by agents with money in hand." In Travancere a very superior quality of fibre is produced, but its not known to what extent the plant is cultivated in the Central Provinces there were 24,800 acres under "False or San hemp." and in Mysore 5,076 acres In Berni under " hemp or Hibiscus cannabinus,"

explains that there are in Berar two The former is in all probability Hibiscus cannabinus and the latter Crota laria juncea In Burma and Assam there are about 500 acres, in each province, of land entered as under "fibres other than cotton and jute " No returns are available for Bengal, but from personal observation the writer would be disposed to think there must be as much in the Lower, as in the

North-West Provinces It will thus be seen that the actual area under sunn-hemp cannot be agricultural ished But

SEPARATION OF THE FIBRE.

The question as to whether the plant should or should not be dried before being placed in the retting tanks having been discussed above, there remains to be given here a brief account of the various modes of retting or of peeling the fibre and of cleaning and boiling it after it has been separated from the stems. In some localities the stems are recom-

AREA. 2117 N W. P. 40,000 acres.

Bombay 26,614 acres.

Madras.

Travancore.

Burma. 500 acres. Bengal.

150,000 acres.

SEPARATION 2118

under the

## CROTALARIA juncea.

## Methods of separating sunn-Hemp Fibre

SEPARATION OF FIBRE.

mended to be buried in the mud at the margin of the tanks; in others, to be submerged in the water by being weighted. In others stagnant water is condemned as destroying the colour and lustre of the fibre, running streams being urged as preferable (Gibson's account of the Bombay fibre). But practical and comparative experiments not having been performed in the other provinces similar to those made at the beginning of the present century by Roxburgh, in Bengal a definite opinion

Leaves stripped

for or against the different methods pursued cannot be offered. After removal from the ground, the stems are tied in bundles (20 to 100 in each), but the leaves are generally stripped off and left on the field fall off naturally mmon practice to OF pla ater for 24 hours,

Length of submersion

tersion 50 length of time required for retting depends largely on the temperature of both the atmosphere and the water. In August and September two to three days will generally (suffice. Messrs. Duthie and Fuller say of " I of the lan or their are ready

Stems praced erect in water, then horizontal.

n, and requires, therefore, longer exposure to reflicination. e then laid down lengthways in the water and are kept submerged by being as abted with earth. The time required for retting varies from three days

by fergh. tion because it renders the separation of the bark from the stalks easier, but

atts of

weakens the fibre. Small pools of clear water, well exposed to the sun's beams, seem best suited for steeping in, because heat hastens maceration, consequently preserves the strength of the fibres, while the clean water preserves their colour. Deep water, being cooler, requires more time for the operation." In the same way running water, although recommended Deep water. Running - - Id seem to be objectionable owing to the longer time water.

the cultivators against oversurp" 5 ...

the connecting tissues Damp mud on by some, is even more objectionable, as

Damp Mud.

it seems impossible to adopt this made of retting without serious loss to

Cleaning of Retted Fibre

the colour of the fibre. Having discovered that the necess tained, the cultivator, standing in the wa

of the stems in his hand, and threshes. gives way and the long clean fibres ... According to some writers, the retted stems, after being partially washed, are taken out of the water and placed in the sun to dry for some hours before being besten out in the way described This practice, while it is followed in some parts of the country, is condemned in others as injurious or at least as a useless delay. In Bengal this system is only followed when the operator is afraid he may not be able to overtake the task of washing before the stems would be over-retted. This partial drying of the stems with adhering fibre would correspond to the seeding of hemp pursued in some parts of Europe; but it seems probable that if sweating be necessary, it could better be accomplished as a further process after the fibre has been separated and approximately cleaned.

In Salsette Island and other parts of Bombay, little or no retting is

Cleaning Sunn-Hemp Fibre.

CROTALARIA Juncea

employed. "The plant while moist is peeled by ately dried in the open air or under cover, accor

weather By peeling, the fibres are better kept arrangement, and give support and strength to each other, whereas, by the process of the Bengalese, they get so materially entangled that a great loss is always sustained. If they are restored to their natural situation by the heckle, there is a loss of nearly one half of the original quantity, which renders the heckled sunn of Bengal of a high price" (Royle) The writer cannot discover any recent description of this Bombay process of separating

stated, the superior quality of likely to be due to the fact that

fermentation Washing the fibre is very tedious, and a man rarely works for more than three hours at a time but is relieved by turns, he will clean is seers a day, which represents the fibre obtained from 5 or 6 maunds of stems Of Khandesh it is said a man earns RI for cleaning 40th of fibre

Reference has incidentally been made to the period when the crop should be cut, and before proceeding to discuss the further treatment of the fibre it may be as well to add here that the period of cutting will depend on the purpose for which the fibre is required A softer and more delicate fibre will be obtained from stems cut just as the flowers appear than if allowed to pass into the fruiting stage A few plants are always than it allowed to pass into the it uning such that it is the cultivators to mature seed for the next year's crop, and from strong Coarse the stems of these they extract a strong, though coarse, fibre On the other hand, it seems to be the habit of some cultivators (the Wunjaras of Bombay) to allow the whole crop to ripen its seeds, this coarse fibre being

all they desire, together with the seeds, which are valued as a food for

Old stems require a much longer period of retting FURTHER PROCESS OF CLEANING THE FIBRE -When the fibre has been separated and thoroughly washed, it is the usual custom to hang it up over bamboos to be dried and bleached in the sun When dry it is combed if required for text le purposes or for nets and lines, but if for ordinary useeg, ropes and twine—it is merely separated and cleaned by the fingers while hanging over the bamboo. In this primitive way the sunn hemp receives all the treatment it gets of the class known to European hemp growers as "breaking" and "seutching" European machinery for cleaning is never used I tis commonly admitted that it is in cleaning the fibre that the Native generally fails most. The process of washing after separation from the stems does not seem to be carefully done quotes a report of a sample of sunn hemp experimented with at Hull, of which it was stated that "by using more care in the steeping and exposure, it will be fully equal to the Baltic." Such opinions are current in the reports of this fibre which appeared while the error existed of supposing it to be Indian-grown hemp or Cannabis satira. It is impossible to avoid the impression that sunn hemp fell into disfavour when this error was exploded. An expert in 1842, for example, says. "Your hemp is very clean-a material point,-but it wants more beating and dressing, and I think the natives have not proper implements to do it with You cannot improve in your mode of packing, it is decidedly superior to the Baltic. I do not despair of seeing the produce of the Baltic supplanted by that of "- " anse in the management of

cut, or is too much steeped the stalk." Unfortunately

such writers that the defects they complained of were due to the fact that Bombay hemp was not bemp at all, and instead of the fibre supplanting I

Wages for cleaning.

Period of cutting.

Soft fibre.

fibre

Seed used as buffaloe food.

FURTHER CLEANING. 2110

Breaking. Scutching

Said to be nearly as good as Baltic Hemp.

000	Dictionary of the Econ	iomic		
CROTALA juncea		np.		
PROPERTY OF FIBRE, 2120		unn Hi	that while to	hat deserves  he bundles, of , it for hen heckled ne another,
£35 a ton.	voi ît	the beg ired to i carefull ion by	nning mprove y, and F the Con	ave seen it of the pre- the quality Royle men- npany that he heckled
EARLY RECORDS. 2121	aldiabaricus, v., I.A., L. 10, but it onside in the fions of London, LXIV., page 99, also describe much Journal the Es	5 1L R	sophical oxburg	h devoted
First Exported.	first few years of the present, cultivated the pla mention we have of the fibre having been e 1791-92. Although numerous favourable report this date, the whole interest in the fibre grad European methods of cleaning it met with a like the natives mowhere practise any system of grow the fibre that can be traced to European influence.	reported ts appeal ually di fate; a ring the p ince. Or  India w thoro port is while r ting f restiga	was in red sho ed out, t the proplant, or the of the cough ends the baston much me proptions had been shown to be proptions had been red to be the proptions had been red to be the proptions had be properly the pro	the year ofly after and the esent day cleaning
•	No. Names of the Plants.	Average weight neach ine broke n	Average weight as each ine broke du with when aref.	Average weight gained by wet- ting the lines.
	Sunn (Crotalatia juncea) cut before the plants cro in blossom and steeped immediately. The same as No. but dived, or rather kept some time before they were steeped Sunn cut when in fall blossom, and steeped immediately.	112 50 130 100	158 78 185 166 203 163	41 20 42 66
}	to the second transfer and the	160	209	31

Properties of Sunn-Hemp.

CROTALARIA inncea.

No.	Names of the Plants.	Average weight each line broke with when dry.	Average weight each line broke with when met.	Average weight gained by wet-
1	Hemp, the growth of the year 1800 from the Co'a Hemp farm near Calcutta	158	190	20
2 29	Jectee (Marsdenia tenacissima) A line made of 15 threads of sail twine (Callore,	248	343	38
-,	Bæhmeria nivea)	240	278	16

PROPERTY OF THE

From these experiments there would appear to be no room for doubt Comparative as to the superiority of the rapid steeping as compared with the drying Further, the winter crop gave the best result. Indeed,

cast Ъv the Bæ the her ast a w

East India

pany do not appear to have taken into consideration. Their attention was first directed to the fibre in Bengal, and without ascertaining whether or not Bengal was the best field for experimental culturation, they prosecuted the effort to improve the Bengal hemp, and failing, allowed the whole subject to drop into the oblivion from which it is only now beginning to recover;

but the new trade is from Bombay, not Bengal, Roxburgh tried the properties of sunn hemp in another way in order Roxburgh's to ascertain the power of endurance which cords made of it had under maceration in water for a considerable period. At the same time he tested the advantages or otherwise of tanning or of tarring the fibres. The following abstract from his report may be here given-

experiments.

AVERAGE WEIGHT AT WHICH EACH SORT OF LINE BROKE NAMES OF THE PLANTS. When tresh After 110 days maceration White Tanned Tarred 1 White Tanned Tarred English hemp, a piece of new 105 Rotten, as was also the tiller-repe Epstables line Hemp from the Company's 74 132 45 All rotten. farm near Calcutta Sunn hemp of the Bencalese 6s 6) ín rotten 51 65 Jate (Bungkefat) 68 6) ٤ı 40 4)

CROTOLARIA juncea.

## Properties of Sunn-Hemp

PROPERTY OF THE FIBRE

Deterioration with age.

Removal of Export Duty

RECENT EX PERIMENTS 2122 Injured by Jute.

Future Pros-

According to these experiments sunn hemp stood the action of the maceration better than did either of the samples of true hemp It has further been shown that a cord 8 inches in size of best Petersburgh hemp broke with 14 tons, 8 cwt, 1 qr., while a similar rope of sunn only gave was with 15 tons, 7 cwt, 1 qr. Dr. Wight found that a rope of coir of a certain thickness broke with a weight of 224th, of cotton with 346th, of American aloe with 362lb, of sunn hemp with 407lb, of Calatropis gigantea with 552th, and one of Ambari (Hibiscus cannabinus) with 200th. Royle has shown the slight deterioration which sunn hemp undergoes in the following statement: "A rope made in 1803 broke with a weight of 6 tons, o cwt., 3 grs, whereas in 1806 it gave way under a tension of 5 tons, 17 cwt, o qr. It is of historic interest to add in this place that the trade in sunn-hemp lulled until the year 1867, when the export duty was removed. From that year returns of the trade of India were regularly published, and it is noteworthy that from about the middle of the present century the bulk of the exports of raw hemp (? sunn hemp) went from Bombay and not from Bengal, in spite of the efforts made a few years before that date to create a Bengal trade. This would seem to point to a superiority possessed by the Bombay as compared with the Bengal sunn hemp. It seems probable that had this fact been realised by the East India Company, their efforts to establish an Indian hemp industry would have been more successful than was the case with their attempts in Bengal. In a Report on the Indian Fibres by Cross, Bevan, King, and Watt,

recently published by E. and F. Spon, the following passage occurs: "It is - - k-neglected fibreimmense success . j. . ibres. At the beginning of the century sunn hemp occupied a much more important true hemp in lled indigenous ng the Colonial to why it was ocurable hat their only ility to procure any other conhe attention of '1. What en-

" as ct.

lay the foundation for a textile industry that may yet come to bear a

anticipated to

the V have 'stick u, t =

## Chemical Properties of Sunn.

CROTOLARIA juncea.

actual experiment not to be the case, then there must be something in the climate or soil of Madras and of Bombay more favourable to sunn hemp than exist in Bengal.

FIBRE.

CHEMICAL AND MICROSCOPIC PECULIARITIES OF SUNN.

2123

lyses they show that when boiled for five minutes in a solution of caustic soda, it loses 8:3 per cent, and after an hour only 117 per cent. Among Indian fibres it occupies the third or fourth place in point of amount of cellulose. According to this classification, Girardinia or Nilgiri nettle heads the list with 89 6 per cent, then Marsdenia with 88°3, and after that Crotalaria juncea and Sida rhombifolia equal, each with 80°0 per cent, cellulose. "The percentage yield of cellulose of the raw fibre is the most important criterion of its composition and value." It may be worth stating here by way of comparison that jute was found to presses 76 o per

ercentago celluloso.

vpress an opinion opposed

would throw out the sugcestion that there apparently exists in some fibres a principle that may have been removed in the process of the analysis adopted by these distin-

be assigned to the famed Poya fibre of Assam, and thus in concluding these remarks a possible explanation may be sought in the mode of hydro-lysis (or washing and blenching) employed. The Poar was found to look 27 per cent by being boiled in causic sod. The residue being the cellu-lose upon which the low opinion of its proposities is based. May it not be that under some other system of hydrolysis at would lose lattle or nothing, and even retain the property of great strength and durability for which it is justly esteemed by the fishermen of Assam for their lines and nets? The writer has for some time felt that one of the features of the exploration of unknown fibres should consist in the establishment, for each, of the peculiar mode of hydrolysis that injured the fibre least, and in chemical reactions that would check the natural degeneration it is liable to undergo. It seems scarcely fair to condemn or to praise a fibre according to its behaviour with one process of hydrolysis, and such a chemical result is likely to be often opposed to actual practical experience. It is satisfactory, however, to note that under a strong alkaline hydrolysis sunn bemp retains all its properties, and under nitration atta as a great weight (150 5), being in this respect third in the list of the Indian fores experimented with by Messrs. Cross and Bevan. A writer in Spons' Ercrelopadia says of sunn hemp : "Samples of the fibre, exposed for two fours to steam

2 R

### CROTOLARIA iuncea.

#### Trade in Sunn-Hemp

## CHEMISTRY of the

at 2 atmospheres, boiled in water for 3 hours, and again steamed for 4 hours, lost only 2 93 per cent by weight, as against flax, 3 50, Manilla hemp, 6 07, hemp, 6 18 to 8 44" This hydrolysis (without the aid of an alkalil so far confirms the results given above, that in point of durability 1 ader caustic alkali (processes of mashing and bleach-

MICROSCOPIC FORM. 2124

hather fibres, and deserves has hitherto attained K -- who wuraca trements of the Indian I shows states and the fibre bundles connot easily separated He con-

es of

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have b

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· bre substance shows well marked Length, 3-5 mm , ends al" The writer in Spons and auree with the I plant may xtent He

says /2 in ; min , 0 157 in , theath, a ... These measurement of that wou min, a oot in d numbers double the oven by Mr King-a fact that would suggest the desirability of the -to once more, especially by having samples of and compared

maturity of seed, Doin - , by the process of drying before retting.

## TRADE IN SUNN HEMP.

TRADE. 2125

Re-examina tion desira-ble,

> Little or nothing can be learned of a definite nature regarding the extent of the trade in this fibre. It is grown in every province, and nearly universally used by the people of India, but, as already stated, definite information is not procurable owing to the confusion which exists in the use of the word "hemp" (sunn hemp in one case, Hibiscus in another, and true hemp in a third, being the fibre alluded to) For this --- unable to discover the extent of the foreign trade in ar that of the exports to foreign hemp, while of

Exports 2126

discontinuea tiic (0) fibre according to European methous, a nore according to European methous, a gup and gradually developed into a position of importance in Bombay The exports of Indian-grown hemp* were, in 1867 68, valued at R1,04,127, but, by Act XVII of 1867, the export duty was repealed, and in the following year they were R2,01,355, and in 1860-70, R5,07,159, of the last-mentioned exports the United Lingd worth, France R17,274, America 1 R7 12,111 worth R5 621, and the P From these and Bengalonly . facts it will be see d exports of mportance is Indian hemp goes to Britain, and or to Bombay than Bengal in this trade From 1869-70 auwii in 1884-85 the exports of raw hemp stood practically stationary, but in the following year

[·] Presumably sunn hemp or sunn hemp along with a certain amount of the fbre of Hibistus cannabings-sampel or ambade

CROTOLARIA Imports and Uses of Sunn-Hemp. iuncea. they developed to R6,88,825, and last year attained the by no means incon-Fempen Goods factured Hempen Goods other than cordage. This continued to expand until, in 1870-71, when it was valued at R1,61,433, of which Bengal had assigned to it R1,53,330. The bulk of these exports went to the Straits Settlements, Ceylon, and Mauritus. From 1871-72, this trade 2127 began, however, to steadily decline, and in 1874-75 was valued at R1,19,327, of which Bengal claimed R1,15,875, and Bombay would appear to have taken no share. Next year these exports fell to R5,299, of which probable that this native industry may have been ruined by the remarkable success of the Bengal jute industry. A difficulty exists in tracing Ropes and 2128 Imports. the bulk of the raw fibre so reported may be the Manilla hemp used up 2120 in the Indian rope factories, and of the hempen goods, canvas and other

fabrics of true hemp. This trade is not extensive; last, ear (1886-87) only 7,641 cxt. of hemp fibre, valued at R1,71,795, was imported, with, in addition, "hemp cloth and sacks to the value of R43,000. Under the heading of the extensive face," I descend he for a days to the value of R43,000. ċ

when it was valued at K96,087.

Uses To which SUNN HEMP IS PUT .- The chief purpose for which USES OF

> Canvas. 2132

2131

2132

Sunn-Hemp-yielding Plants. CRC	TALARI. retusa.
Food and Fodder.—It has already been incidentially remarked that in some parts of India the seeds of this plant are collected and given to cuttle. Roxburgh arys: "This plant—and it is the only one—is also cultivated by the natives of some parts of the Northern Circars to feed their mitch-coas with during the dry sexion [ have found that it is	Seeds 2146
food.	MEDICIN
Crotalaria laburnifolia, Linn., Fl. Br Ind , II , 84.	2148
A shrubby plant met with in the Western Peninsula, particularly in the South Concur Properties similar to those of the next species. It is	
C, Leschenaultii, DC; Fl Br. Ind., II, 76.	2149
An abundant plantion the Nilghiri Hills and higher portions of the	Satara
Western Ghats This is alluded to by Mr. J. H. Grant as the plant used in Satura for paper-miking. It is there known as dingodu. Dalzell and Gibson say it is the dingala, and is common on the higher ghâts.	Paper. 2150
C. medicaginea, Lank.; Fl. Br. Ind., II., 81. Vern — Guleti, Pa. A diffuse perennial abundant in the tropical regions of India from	2151
Kashmir to Burma, ascending to 6,000 feet in altitude Medicine—This plant is officinal in the Panjáb being sold in the bazárs under the name of gulabi (Biden Powell, Pb. Pr., 343)	MEDICINE 2152
C. prostrata, Roxb; Fl Br. Ind, II, 67.	2153
A slender creeping weed, common on the drier plains of India ascend-	-
ing to 6,000 feet.  This is known to the Santals as Nauha shunka or Katie'shunka, and by them it is used medicinally in derangements of the stomach. It is known in Bengri as Choto-shunshun (small shunshun, see Vorgt, \$\rho\$ 207) Roxburgh says this is known in Felegu as Sers gally-grata.	2154
C. retusa, Linn; Fl Br Ind, II, 75	2155
A robust under-shrub, 3.4 feet in height, with stout stricted branches n on sandy soils, flowering in February te tropical regions of Indus from the Also met with in China, North Aus-	
	FIBRE 2156
Weight state that in C. S. T. T. S.	
Wright states that in South Ind a the fibre of the plant e rev lart endd	
i.	

CROTALARIA VEITUCOSI.

Sann-Hemp-yielding Plants

known as Bil jhunghun, in """ -- " " "
Ghagri (Man), and in Coyl
Roxb, Fl. Ind., Fd. C.B.C. 4,

(Conf with

2157

Crotalaria sericea, Ret: ; Fl Br. Int., II. 75.

A plant very much like the preceding and found over the same region. Stewart any att is cultivated in the Pinjih as a garden flower, and is

21<u>5</u>8

Thanghanes. It flowers in the cold season.

2159

C. striata, DC.; II. Br. Ind , II , 84.

FIBRE 21.0 A lon-growing shrub, with robust, sulcate, thinly silky branches, and large yellow flowers striped with red Furly abundant throughout the warmer parts of India.

The Rev. A. Campbell states that this is cultivated by the Santals in

Charms, 2161 Chuir Nagpur on account minily of its fibre. The plant is known to them as Son jhinka, and to the Hindustrian-specking people of that region as Son, San. He adds that the root or a small portion of the stem is ted to the wrists and neck of a person suffering from dropsy. Roxburgh remarks this is known to the Telegu-speaking people of Madras as Munga.

2162

C. tenuisolia, Roxb., II Ind., Fd. CB.C., 546

This has been reduced by most botanists to a synonym for C. juncea, Linn, which see

2163

C. tetragona, Roxb; Fl. Br. Ind., 11, 78

A sull, very handsome strub, often 63 feet in height, met with on the lower Himsi
Pegu Kurz
Chu Yain
Chu Yain
in his List 6,
11 s known by the Paharia names of Kengen, keluksand, and to the

Lepchas as Subutung rung
C. verrucosa, Linn; Fl Br. Ind II, 77, Wighl, Ic, 1 200

Vern —Ban san, Hind and Benc killupi, TAM, Ghelegherinta, Ainslie) Sir Walter Elliot species Allogilistch-cha, gila according to Trimen

Habitat —A copiously branched half-shrubby plant, 2-3 feet in height, with blue, in hite, or jellow Bowers, Iound in tropical regions but ascending the Himalaya to 2,000 feet in affutude, and distributed east to Burma, the Malaya, and China. Also met within Africa, Mauritus, and tropical America

MEDICINE Juice 2164 Medicine —Annshe says "I have given this a place here, on the authority of Rheede, who informs us that the junce of the leaves is supported by the signify butter, but not stalks of this low growing internally, and externally, and externally.

1 / Junites by 1/minut	•
The Croton	CROTON Joufra.
CROTON, Linn; Gen Pl, III, 293 The generic name Κρότων (a tick) was given by Linnæus to this assem-	2165
blage of plants in allus on to the shape of the seed. The chief med enal species C Tiglium, was frest made known to Europe in the sixteenth century, and for some time it was in demand, but in the seventeenth century it fell	
	j
Croton argyratus, Bl., II. Br. Ind., V., 383, EUPHORDIACE X. Syn.—C. BICOLOR, Roxb. Vern.—Chonog, Burrn., Talib dd., And References.—Roxb., Fl. Ind., Ed. C.B.C., 687, Gamble, Man Timb., 359, Kurr, For Fl. Burm., II., 372	2166
Habitat —A moderate sized or small evergreen tree of Martaban,	TIMBER.
	2167
C. aromaticus, Linn, Fl Br Ind, V, 388	2168
Syn — C LACCIFERUS, I'III ALRUSITES LACCIFERA, Willd Vern — Wilkephild, Sino Lid phind, Tam (ames used in Ceylon for C aromaticus, the form C laccifera being Kephitysin Sino) References — Briddome, Forsiere a Man, 201, Wight, Fc, 19, 15, Liubon U Pl Bomb, 121 Trimen, Cat Ceylon Pl, 81, Gamble, Man Timb, 358, O Shaughmenzs, Berg Dub, 553	
Habitat —An aromatic shrub or small tree, met with in the Dekhru from the Concan southward Medicine —Said to be used medicinally Thwaltes remarks that the lac obtained from C lacciferus "is employed by the Singalese for medicinal purposes."	ļ.
C. caudatus, Gasel, Fl Br Ind, V, 388	2170 2171
Syn — C DRUPACEUS Roxb Vern — Namhanter Bevg Takchabrek, Lepchia, Wusta Univa References — Roxb., Fi Ind. Et. C.B.C. 658 Voict, Hort Sub Cal, 159, Aure, For Fl. Burm, 11, 375. Gamble, Man Timb, 359–359 and AVI.	2.,.
Habitat.—A large straggling, more or less scandent, shub of Bengal Assum, Burma, and South India, found chiefly on the bruks of streams Roxburgh states that it is a native in the country about Dacca, and flowers in March, the seeds ripening in September Medicine—Mr Home, Conservator of Forests, writes, the leaves are	
applied as a poult ce to sprains. Structure of the Wood - White or yellowish-white, hard, close-grained Home says it is used for fuel	2172 TIMBER. 2173
C. Eluteria, Bennett, affords Cascarilla Bark, -an imported drug.	2174

C. Joufra, Rosb , Fl Br Ind. V , 387

tree or shrub

Vern -According to Roxburgh Joufea is in Sylhet the name of this small C. 2175

010	Metterary of the Lear on te
CROTO oblongilo	N The Oblong leaved Croton
	References - Kirs I r F' Barm II rig Gambe Wan Timb, 319 Me lice' T h ymle, 140, belgt, H r' Sib Cal, 155
MEDICINE	Habitat.—A small shrub very a milar to C oblongifoline, but with smaller more accumulate leaves, met with in the I astern Pen nsulasylhet, Sibasyar, Periu, Upper Burma, &c. I lowering time March and April Medicine—I ike most other species the leaves seeds, and root of the
2176 2177	species are occas on ally spoken of as used medicinally  Croton laceiferus, I inn., a form reduced to C. aromaticus, Iinn by the Flora of British India.
2178	C. malabaticus, Bediorie; Fl Br Ind., V., 386  RescreacesBallone Sc., t. 171, & Forester's Man., 204; Gamble, Van., Timb. 359, Litboa, U. Il. Bomb., 121.
MEDICINE 2179	Habitat —A small tree common in the western forests, ascending to 4,000 feet in altitude, Malabar, &c.  Medicane —Said to be used by the natives of India for medicinal purposes
2180	C. oblongifolius, Rovb , Fl Br Ind , V , 386.  Ve Rova pa h Bena (accord Nepal, Aurit, Sural Acte, Fl L, Constal Acte, Fl L, C
OIL 2181 MEDICINE Seed 2182	re used re Irone  "" II Dr Dymock writes was drawn by the native one of the most valuable
Fruit 2183 Root bark 2184	me, at the time, proved  h ( chlore for m The Goanese and k in chronic rmer disease
Root 2185	ipplication to est in large (Pharmacog d for those of ntals use the

The Purging Croton.	Tiglium
the properties having been but recently understood. There is no good to be U. O. Dutt your claimed to be U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the U. O. Dutt you have a properties of the Wood.—Whitish to yellow, close-grained, moderately hard and heavy; lable to crack in seasoning.  **Domestic Uses.—The plant is frequently employed for fences.	TIMSER. 2186 DOMESTIC. 2187
Croton polyandrus, Roxb., see under Baliospermum montanum, Muell, Vol. I, B 28  Hooker, in the Flora of British India, V. 461, reduces this to B. axillare, Blume Consult also O'Shaughnessy's Bengal Dispens, 555, U. C. Dutt's Mat. Med of the Hindus, 229, and Dymock's Materia Medica, West Ind. 2nd Ed. 688, the last work has appeared since the issue of the 1st volume of this publication.	2188
C. reticulatus, Hojne; Fl. Br. Ind., V., 386.  Syn.—C. hypolegis, Dala; C. Evelanicus, Muell-Arg. Vern.—Pandharı or påndharısala, Max.  References —Dymack, Mat. Med. West Ind., 2nd Ed., 684; S. Arjun, Bomb Drugs, 192 Thavaites, En. Ceyl Pl., 276; Dala., and Gibs., Bomb Fl., 231; Lusba, U. Pl. Bomb, 121  Habtat.—A shrub with slender branches, met with in the Dekhan Pen insula from the Koncan southwards, distributed to Ceylon.  Medicine.—Sakharam Arjun vays the bark is "used as a bitter and stomachic."  C. sebiferum, Linn, and Saplum sebiferum, Roxb, are synonyms for Stillingia sebifers, the Chinese Tallow Tree This is now cultivated to some extent in India, and, according to Roxburgh, is known in	2189 MEDICINE. Bark. 2190 2191
Bengal as Momehina  C. Tighum, Linn, Fl Br Ind, V, 393.  The Pugging Croton.  Syn.—C. Panna (or Parana), Hamilton  Ve	2192

CROTON The Parging Croton. Tiglium. At Ren. Vet VI, 164, 1141; Fisch, le Hanh, Pharmatre, 1843 U. S. Dujem, 19th Ed. 174, 1251 filent, le Term, 1861, II, 2013 S. Apric, Book, Direct, 1913 British, II, and Bookt, Suel, 1873 Warley, Barr Ved., 193 Vest book of Physic, 1371, p. 64, Peron, 27, 1874, h. that he first att Medical fre, arm, when he first flower for the feeth of the flower, C Pl. ray faster, U. P., Bord, 11, 385; Be to the first flower, C Pl. ray faster, U. P., Bord, 11, 385; Gailer to the first flower, C Pl. ray faster, U. P., Bord, 11, 385; Gailer to the first flower flow Habitat.—A small tree (15 to 20 feet high) met with under cultivation throughout the greater part of India; probably indigenous of only naturaheed in Eastern Bengal and Assam and southward to Malacca, Burma, and Cerion. Oil .- The nuts yield an oil which is orange yellow or sherry-reloured, OIL Muts. of the consistence of nut-oil, has a slight odour resembling that of julap, 2103 and an acrid flavour. This is a valuable medicinal oil, which is used as a drastic purgative, especially when it is desired to act speedily and powerfulls on the bowels, and when only a small solume of medicine can be administered, as in cases of obstitute constitution, in dropsy, in apoplexy, in paralysis, and in cases, when the patient cannot or will not snallow, Bombay. when the oil may be dropped on the tongue. As prepared in India it is 2104 Cochin frequently so much adulterated, that it finds no sale in Europe. The 2105 Chinese. nuts are exported chiefly from Bombay and Cochin (often being also Chinese re-exports), and the oil is expressed in England. Dr. Dymock 2106 informs the writer that the oil is expressed at the Government Medical European Expressed Store Depôt at Bombay. It costs about 12 annas a b, whereas in 1825, the same oil was sold for about 10 shillings an ounce in England. 2107 The plant used to be grown for the purpose of its seeds at Henra, but the supply is now imported from China via Singapore. The nuts sell for Rsi per maund of 41fb. It is necessary to be cautious in handling the nuts or the oil, owing to their bhstering the skin The oil is frequently used for colds in the chest as an external application, causing a severe blister It is much resorted to as a domestic cure but is not recommended by the profession 2198 § "The drastic principle of the oil has not yet been isolated; it appears to exist not only in the seeds but also in the leaves and wood" (Professor Warden, Calcutta). MEDICINE. Medicine. The SPEDS are used as a powerful drastic purgative, and the oil is regarded as a valuable medicine. In overdoses they act as an Seeds. acro-narcotic poison. When externally applied the oil is a stimulant 2100 Oti rubefacient and counter-irritant. Croton oil is said to possess powerful hydragogue cathartic properties. It is also useful in dropsy, obstinate 2200 constination, and apoplexy. The ancient Hindu books make no mention of the oil, the nuts boiled in milk or roasted in a pellet of cow-dung, appear (as at the present day) to have been used One seed is a sufficient dose, and, according to many writers, the skin of the seed, as also the contained cotyledons (or seed leaves), are poisonous. The boiled or torrefied albuminous substance, mashed up and deposited in the interior of a raisin, is the form in which natives generally prescribe the drug, but it is often combined with astringents, such as myrobalams, cutch, &c , these additions checking the acrimony of the nut and preventing griping. Waring says that 2201 should the administration of the nut cause griping, vomiting, or too violent purging, a good large draught of lime-juice is the best remedy, and it

may safely be repeated in half an hour if the vomiting, &c, continue. Dutt remarks that, according to Hindu hterature, the seeds are "useful in

fever, constitution, intestinal norms, enlargements of the abdominal viscera, ascites, anasarca, &c. 22 C. 2201

The Putging Croton	CROTON Tiglium
Dr. Fleming (in the Asiatic Researches, 1840) writes :— "The seeds of this plant were formerly well known in Europe, under the names of Grana Tiglia and Grana Molucea They were employed the control of	MEDICINE. Grana Tiglis 2202
	١.
centre of it, b) which precaution, it is found to act less roughly, and then rubbed with a little rice gruel, or taken in a bit of the plantain fruit "Ainshe quotes (in the first edition of his work published in 1813) the opinions of a few Indian medical officers who re-made known the properties	1
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Brown and Arman State of the	ı
· •	
excited the most frightful hypercantharsis, although some individuals have taken it to the extent of even ten minims without any very sensible effect. He adds from his own experience, that he would be very cautous in exhibiting the oil at first in larger doses than one or two minims, to adults, it to prove a libbed up with means. Madras found which means Madras found from the control of the co	Root 2204 Leaves 2205
	5.5
Special Opinions.—"§ Drastic purgative, used in obstinate constipation, amountit boda in Beng Shib Chunder their ment this d	2207

#### ROZOPHORA plicata.

## The Indian Turnsole.

EDICINE. 2208 Mann Dispensary, Hothangabad, Central Provinces) "The seeds, half reasted over a lamp or candle flame, and the smoke inhaled through the nostrils, relieves a fit of asthma" (Surgeon-Major R. Thomson, M.D., C.I.E., Madras) "I have found the oil diluted with 9 or 10 parts of mustard oil or olive oil to be a very useful limitent in infantile bronchins" (Doyal Chunder Shome) "Have used it as a diuretic, purgative, and rubefacient" (D Picachy, Cwil Medical Officer, Phrinch), "The seed is frequently applied over the temples for headache and eye affections" (Surgeon-Major Robb, Cwil Surgeon, Ahneadabat,

2200

2210

Croton tinctorium, Turnsol, see Crozophora (Chrozophora) tinctona,
A Juss.

Crown Bark, see Cinchona Condaminea, Huml, Rubiace E. C. 1129.

CROZOPHORA, A Juss , Gen. Pl , III., 305

By an unfortunate oversight, the old error in the spelling of the name given to this genus was not corrected when arranging the material for the present volume, and this has had the effect of planing it in the wrong alphabetical position. Being derived from χρωζω the word should of course be Chrozophora as corrected by Necker.

2211

Crozophora (Chrozophora) plicata, A. Juss , Fl Br. Ind , V., 409; EUPHORBIACE.E

Syn - C ROTTLERI, A Fusz, C PLICATUS, Vahl; C ROTTLERI, Gessel C. TINCTORIUS, Wall; Burm, C PLICATUM, Willd (in Roth, Fl Ind)

Vern - Shadevi, subali, sonbalis, Hind , Sind and Okharada, Guz , Khudi-akra, Benoe, Pango mars, Santali, Suryaparia Sans , Pik kanda, nilkhanti, nil akras, Pe.; Neal boti, Tank , Gurugu chettu, linga miriyam, Tel.

muryam, 1-1.
References - Resh, Fl. Ind. Ed. C.B.C., C.S.T. Themselv, England References - Resh, Fl. Ind. Ed. C.B.C., C.S.T. Themselv, Fl. P. L. 193. Elliot, Fl. Anderson Co., 107, Rend. A. Campbell Descrip Cat Econ Prod. Chitta Nagpur, 18, Anvalus Mat Ind. 11, 136 Dymock Mat Ned., Chitta Nagpur, 18, Anvalus Mat Ind. 11, 136 Dymock Mat Ned., W. Ind., 3nd Ed. 716. S. Aryun Bomb Dirge 32, Marray 19, and Dirge Sind, 34, Dray, U. Pl., 105, Lubea, U. Pl. Bomb, 295, R. M. 198. P. R. M. L. 198. P. L. 198. P. L. 198. P. R. M. 198. P. R.

Sir Waiter Elliof remarks of this plant "This is the Indian Turnsol-Royle, III I, 129 Misked by the English name Wilson, Brown Piddington, and others have imagined the plant to be the sun floare, and still further to increase the confusion, they have turned the old Greek name Chiczophota tunctoria, L (βλιοτρόπου μικρου) into the modern Heliotrope, and explained the vanous Indian manes of Croz plicats by Helitropium (Tiardum), indicum, Lindi 1/7ς Aire, ρ. 28." This mustake has been repeated by O'Shaughnessy, who says that Chrozophora tunctorium, the Turnsol (Turnsole) is the Hηλιτρόπου

2212

Habitat —There are two well marked forms of this plant—(a) a small procumbent annual, found in sandy damp situations, such as on the banks of rivers and in the bottoms of dried-up tanks, (b) an erect perennial bush; form These have apparently been reduced to one species by the Flora of British India. They both occur here and there throughout the wirmer parts of India, from the Panjáb to Bombay, Madras, lengal, Burma, and Ceylon In the drier regions of Upper India the bushy condition chiefly occurs, and this is probably doublidly distinct from Garzaphora tunctoria. The procumbent form is more abundant in Bengal,

purpor of Dioscorides "

The Turnsole.

CROZOPHORA tinctoria.

Madris, and Burma, and is of no interest from an economic point of view, since the properties described below are alone applicable to the erect plant, and to Charosphora intertorias. The confusion alluded to by Sir Walfer Elhot may be accounted for by the fret that the crumpled leaves of the procumbent plant are remarkably Boraginacous in their

are remarkably Boraginaceous in their with

on to dye.

Afnshe, who saw the manuscripts of Roxburgh's Flora Indica, says — it R
would appear that, cloth, mosterned with the juice of the green capsules, becomes blue after exposure to the open air, they, no doubt, contain colouring matter, which might be turned to good account in the airs "

DYE. 2213

species

Fibre.—The Santals prepare a strong and useful rope fibre from the bark, but it is difficult to separate (Campbell).

Medicine.—The asigns of the root are given to children in coughs.

The LEAVES

The LEAVES

The Milkhanthi

I ce Revd A Campbell structs the Carista Carandas

Carandas

for blistering Hamilton (MSS) had brought to him in Behar, as one of those which was supposed to

have virtues in leprous affections, the dry plant is made into decoction, to which is added a little mustard" (Ainslie)

Nagpur and Upper India

Timber.—The stems of both this and the next species are regularly collected as fuel Dr. Slewart says of C. tinctoria. "It is cut and carried into the city of Lahore to be used as fuel in ovens." This fact may be accepted as proving that the bush forms here alluded to are both perennal bushy plants 1-3 feet in height and not "prostrate form would appear to be perfectly distinct, and to be most probably the Croton plication described by Roxburgh as met with in rice fields of Bengal, as distinct from the bushy perennal found in Chutia!

Crozophora tinctoria, A Juss., Il Br. Ind., V., 408.
TURNSOLE, Eng

Vern — Shades, sonballs, subalt, Hind & Sind, Tappal buts, milan, kukronda, Pe; Kap-o-chist, in the Hari rud Valley, Afghánistan (Astchison)

Habitat.—Common in the Panjab, Sind, and the Deccin, distributed enstward through Afghánistan to northern Africa and the Mediterrinen, cultivated in the south of France The specimens of this plant collected in Afghanistan by Attehson, in Quetta by Lace, and in Gilgit by Giles,

FIBRE
2214
MEDICINE.
Ashes
2215
Leaves.
2216
Seeds

2210 Seeds, 2217 Root. 2218 Dry Plant, 2210 TIMBER Fuel,

2221

2220

.

# CROZOPHORA

#### The Turnsole.

DYE Blue. 2222

Yellow.

2223

Green.

2224

Litmus on Rags.

2225

Powder. 2226 less woolly leaves than either C. plicata (procumbent form) or C. tincto-ria, but is covered with a granular meals substance

ria, but is covered with a granular mealy substance Dye -Although it seems probable that most Indian authors who allude to having observed the fruits of Chrozophora yielding a purplish dye, speak of the erect perennial form of C. plicata, still C. tinctoria doubtless affords the same dye in this country as it is cultivated for in France. Apparently no advantage is taken in India of the dye principle yielded by either plant, and it may therefore be of some practical utility, in any possible future efforts to establish an industry in this die-stuff, to give here a brief abstract regarding its European uses and methods of preparation. The researches of Dr. Joly (Ann de Chim et de Phys , VI., izz') have shown that the dye principle occurs in all parts of the plant and not in the fruits only It is also present during every stage of the growth of the plant and abounds in the cellular tissue occurring as coloured particles. As with indigo green so with this substance, by oxidation it becomes blue. When the fruit "is immersed in twice its bulk of water and heated to from 50° to 60°, that liquid assumes a rather deep violet blue colouration, and deposits, on being evaporated, a beautiful azure-blue resinous Acids turn the colour of the aqueous solution to a yellowish red which is not rendered blue again by alkalies but becomes greenish By this reaction, therefore, the "litmus on rags" is distinguished from the litmus of commerce The researches of Dr. Langdale and Dr Martius, made with the juice of the plant just described, have proved that it dyes, without the aid of mordants, a violet-red upon wool, silk, and cotton tissues, and that this colour may be rendered fast by steaming and the simultaneous action of ammonia vapours, which, however, turn the colour more blue" (Crookes, Hand-book of Dyeine, Se, 383) "This dye ealled Turnesole, and is obtained by grinding the plants—the besteldom more than a foot high—to a pulp in a mill, when they yield about half their weight of a dark green coloured juice, which becomes purple by exposure to the air or under the influence of ammonia. It is chiefly exported to Holland, and is prepared for exportation by soaking coarse linen rags or sacking with it, the rags being previously washed clean. After sorking they are allowed to dry, and are exposed to the influence of ammonia by being suspended over heaps of stable manure. They are then packed in sacks and are ready for shipping to Holland" (Tre wary of Rotany) "The red colour of the outer crusts of some kinds of Dutch cheese is due to the presence of some lactic and butyric acids in that substance No good substitute for this 'himus on rags' for the last named purpose has as yet ever been found A sum of £10,000 is annually paid by Dutch farmers, chiefly to the inhabitants of Grand-Gallargues, for a commodity which, at first sight, no one would take to be any thing else but duty rigs, best suited for piper-making after having been

Sacking Impregnated 2227

	PTERONI Descens.
can discover no evidence of its ever having been utilised by the natives of India, but it is a remarkable coincidence that in Bengal, at least, it bears a name (oken) now given to several introduced American plants. Dr. Buchanan Hamilton's remarks regarding the introduction of Bixa Orellana having displaced an indigenous de-pickling plant ingit be even viewed as having reference to Chrosophora. In connection with the Calcutt International Exhibition the author published, in his Catalogue	TURNSOLE DYE.
of the D. Co. He at the other many and forter prime have a non-lead	2229
	Of Interest Indigo Planters. 2230
Jatropha glandulifera or Chrozophora tinctoria.	
CRUSTACEA.	2231
prawn (chingra) is often very plentiful in tinks, and on certain occasions may be seen to multiply in a perfectly marvellous manner—a tank sometimes suddenly appearing full of them and as suddenly mpty. Although largely caught, the natures of India do not appear to fish systematically for Crustacea. Dr D MacDonald says of Bombay "The Crustacea, especially prawns, are very numerous, but mostly get caught along with real fish in the nets, and, every the crab-hook" (used at low water for catching crabs in the crewces of the rocks) "no particular gear is used in their cipture. There are no lobsiters, although large crab fish are commonly sold by that name in the Bombay markets, and none of the numerous crabs attainthe size and quality of those of northern seas. Crab and lobster pots are unknown" Ainslie gives the following vernacular names. Ingiha, HIND. Agui matiya, Sans., Eeral, Taxi., Roiclu, TEL He remarks that Coast.  Phrod-ps with nitty of	FOOD Crabs. 2232 Frawn. 2233 Lobsters. 2234 Cray nish. 2235 Shrimps, 2236 2237 MEDICINE. 2238
CRYPTERONIA, Bl; Gen Pl, I, 782	2239
Crypteronia pubescens, Blume, Fl. Br. Ind, II., 574, Gamble, Vern — Ananbo, Burm Patrix — A trac on foot in the other mat. Wh. D. T.	2240
for fuel,	TIMBER. 2241

## CROZOPHORA

Tle Trentale. tinctoria. less wer l'e le ura than e der C. p'erata (procumbert f em) or C. Lacto. tia, but is severed with night males must aute to n DYE Dyr -Ald such & ecome potatte that most intan anchors who 1 ... 2222 al' ille to Laving of wever the few to of Cheesophers yielding a purplish the, speak of the erect personn at I em of C. plicata, will C. ifectoria thus there as with the same ther in this country as it is cultivated from Pearies. Apparently an advantage is taken in India of the dise principle an'ded by either plant, and it may therefore be el some practical will ty, in any post l'e future efforts to establish an indistry in this diestuit, to give tere a be elabstract regarding its European uses and methods of preparation. The re exceles of Dr. Joly (dan de Clam et de Phys. Pla iet.) have at contlat the the principle recurs in all parts of the plant and not in the fruits only It is also present during every stage of the growth el il e plant and alounde in il e er lular tiesue occurring as coloured partu cles. As with and guigeren so with this substance, by oxidation it becomes Yellow. b'ur. When the fru t " is immerced in twice its birk of water and heated 2223 to from 50" to to", that liquid assumes a rather deep vo'et blue co'ouration, and deposits, on being evaporated, a braut of asure-blue resmous Green, substance. Ands turn the culour of the aqueous solution to a sellowish 2224 red which is not rendered blue again by alkalies but becomes preenish. By Litmus on Rags. this reaction, therefore, the "latinus on rays" is distinguished from the 2225 litmus of commerce. The researches of Dr. Languale and Dr. Martius, made with the jurce of the plant just described, have proved that it dyes, without the aid of mordarts, a sweet-red upon wool, silk, and cotton tusues, and that this colour may be rendered fast by steaming and the simultaneous action of ammonia supours, which, however, turn the colour Powder. more blue" (Crookes, Hand-book of Dyeing, &c , 383). "This dye is 2220 called Turnesole, and is obtained by grinding the plants-little herbs seldoin more than a foot high-to a pulp in a mill, when they yield about half their weight of a dark green coloured juice, which becomes purple by exposure to the air or under the influence of ammonia. It is chiefly exported to Holland, and is prepared for exportation by soaking coarse linen rags or sacking with it, the rags being previously washed clean. After sorking they are allowed to dry, and are exposed to the influence of ammonia by being suspended over kapps of stable manure. They are then packed in sachs and are ready for shipping to Holland. "Tresurry of Bolany)." The red colour of the outer crust of some kinds of Dutch Sacking Impregnated 2227 cheese is due to the presence of some lactic and butyric acids in that substance. No good substitute for this littinus on rags' for the last named purpose has as yet ever been found. A sum of £10,000 is annually paid by Dutch farmers, chiefly to the inhabitants of Grand-Gallargues, for a commodity which, at first sight, no one would take to be any thing else but dirty rags, best suited for paper-making after having been bleached. A portion of the rags, after having been used to rub cheese with, are sent back, because it has been found that the old rags take up and develope the colourable matter more readily than new ones' It would thus appear that Chrozophora affords a colouring principle TRADE, closely allied to Orchil and Litmus, but in the method of its preparation it is 2228 closely allied also to Indigo. How far this dye is capable of meeting

other markets cannot at present be foretold, but there would seem every reason to suspect that a very extensive trade might be done in it. The plant is wild everywhere on the waste lands, of India, luxuriating on both dry sandy tracts and river margins; it might be grown at a small cost anywhere, and the subject thus seems well worthy of attention, as

there are many purposes to which it might be put in India. The unter C. 2228

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2	[
CRUSTACEA.	2231
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CRYPTERONIA, Bl , Gen Pl , I , 782	2239
[Man Timb, 199, LYTHRACFE, Crypteronia pubescens, Blume, Fl. Br. Ind., II., 574; Gamble, Vern Ananbo, Burn	2240
Problem 1. A reason feat in his one make the _ To man.	2241 1

CRYPTOMERIA japonica.

The Cryptomeria.

## CRYPTOCARYA, R. Br.; Gen. Pl., III., 150.

Several species afford valuable timber.

Cryptocarya amygdalina, Neer; Fl. Br. Ind., V., 118; LAURINEE. Vern .- Paimare, Nepal , Kalaise, Lepons

High tot _ 1 tons , the great to at eased ac. to at from Nepal eastwards to: North Arthurst Arthur

2242

C. ferrea, Bl.; Fl. Br. Ind., V., 119.

[ Lisboa, U. Pl. Bomb , 113. C. Wightiana, Thwaites; Fl. Br. Ind., V., 120; Wight, Ic ,t. 1829; Vern.-Golu-mora, Sinc.

Habitat .- A tall tree, frequent in the Dekhan peninsula from Kanara southwards to Ceylon. Structure of the Wood,-Strong and durable, useful for building

TIMBER. 2246

2247

purposes.

## CRYPTOLEPIS, R. Br.; Gen Pl., II, 740.

[Ic., 1 494; Ascieriore. Cryptolepis Buchanani, R & S, Fl Br. Ind., IV., 5, Wight,

Syn -Nerium rediculatum, Roxò. Vetn.—Karania, H.nd., Utri dudhi, Santal, Guruga pala-tige, adavi-pála-tige, madana séku, Tel. (At Sinhachalam it is called Mafati like

climber, Elliot) References.—Rarb, Fl. Ind., Ed. C. B. C., 244, Brandis, For Fl., 330; Dals & Gibs 148 Gamble, Man Tumb, 255, Kura, For Fl. Burm, Il. 159 Elliot Fl. Andh., 11, 67, 109, Campbell, Cat Forn Fl., Chatia Naspur, 49, Rheede, Hort Mal., IX, 11, Grah, Cat Bomb. Pl . 113

Habitat .- A climbing plant, met with throughout India from Kashmir to Assam, Burma, Coromandel, Travancore, &c, ascending the Himá-

layas to 4,000 feet in altitude, distributed to Ceylon

Fibre.—Sir Walter Elliot says the hill people of Vizianagram make cordage and a kind of cloth from the fibre derived from this plant. Medicine.-The Rev A Campbell states that the Santals make a

preparation from the plant which they give to children to cure them of rickets. They also combine it with Euphorbia microphylla, Heyne (the duding phul), in the formation of a medicine to be given to women "when the supply of milk is deficient or fails." Both the plants so used having a milky sap, it may be presumed the properties attributed to them by the Santals rest on the "Doctrine of Signatures."

CRYPTOMERIA, Don; Gen Pl., III., 428. 225t Cryptomeria japonica, Don; Confferm

Habitat .- A handsome tree, native of China and Japan, but largely cultivated throughout the districts of Dargeeling, Simla, and occasionally in other hill stations

C. 2251

FIBRE. 2248 2249

MEDICINE.

2250

Caoutchouc-producing trees.

CRYPTOSTEGIA grandiflora.

Structure of the Wood.—White, so't, with a brown, often almost black, heart-wood; very uniform, with narrow bands of darker and firmer tissue at the edge of each annual ring. 71MBER. 2252

CRYPTOSTEGIA, R. Br.; Gen. Pl., II., 742.

[ASCLEPIADACE Z Cryptostegia grandiflora, R.Br.; Fl. Br. Ind., Vol. IV., 6; 2253

Veru.—Vilarjuti valundi, Mar (according to Dr. Sakharam Arjun in a letter to the author), Palay, Mar. (according to Sir George Birdwood).

Habitat.—An extensive climber, cultivated in various parts of India; supposed to be a native of Africa or Madagascar.

Caoutchoc.—Dalzell and Ghson (Bonh, Fl. Sp. 55) say "the whole plant abounds in a milky caoutchout juee, which is like India-rubber, but hardly elastic." A considerable effort is being made to extend the cultivation of this plant both in Madras and Bombay (See Agri-Hort. See Jour Mad., 1832-84, and Rep. Bet. Gard. Hyderabad. Sind, 1832, p. 7; all Rep. Dir. Agri Bomb, 1853-84, p. 70. A sample of the Sni prepared Caoutchouc, obtained from the plants grown in the Botanic Gardens, was reported on in August 1832, as follows, by Mr. T. P. Bruce Warren, Analytical Chemist to the Indian Rubber, Gutta Percha and

CAOUTCH-OUC.

ouc. 2254

the light colour of Ceara rubber. The whole had become agglomerated by the adhesiveness of the little separate masses of which the sample was composed.

"The sample was carefully torn to pieces and examined, a separate

conpartly

2255

washing 2 3 per cent

"Mixed with the suitable proportion of sulphur and heated, both portions vulcanized remarkably well I might have been expected that the least oxidized portions would have yielded a tougher and harder product when vulcanized, as compared with the darker portions, but in this respect no difference could be preceived"

The Conservator of Forests, Northern Circle, Bombay Presidency, wrote on the 16th January 1888, that Cryptostegia grandiflora "is cultivated in gardens in nearly every station in India, and can be easily propagated The cost of collecting the sap would be so great that a plantation is not

2256

	• •
CRYPTOM japonio	
İ	CRYPTOCARYA, R. Br.; Gen. Pl., III., 150.
,	Several species afford valuable timber,
2242	Cryptocarya amygdalina, Nece; Fl. Br. Ind., V., 118; LAURINEE
•	VernPaimare, Neval, Kaledso, Lepchs.
Timber.	Habitat.—A tree with spreading branches, found from Nepal castwards to the Khasia hills and south to the Andaman islands. Structure of the Wood.—Strong and useful.
2243	C. ferrea, Bl.; Fl. Er. Ind., V., 119.
2244 2245	[ Lisboo, V. Pl. Bonb., 113. C. Wightiana, Thioxides; Fl. Br. Ind., V., 120; Wight, Ic. 1. 1829;
	Vern.—Golu-mora, Sing.
	Habitat.—A tall tree, frequent in the Dekhan peninsula from Kanara southwards to Ceylon.
timber. 2246	Structure of the Wood.—Strong and durable, useful for building purposes.
	CRYPTOLEPIS, R. Br.; Gen. Pl., II., 740.
	[ Ic., 1. 494; Asclepianer.
2247	Cryptolepis Buchanani, R. & S.; Fl. Br. Ind., IV., 5; Wight,
	Syn — Nemusk kericulatus, Roxh. Vern.—Karania, Huns, Ubre dudhi, Sutal; Gurnga-páladíge, adavi- páladige, madana séku, Tel. (At Sinhachalam it is cálled Modati-like clumber; Elliot.)
	References.—Rosb., Fl. Ind., Ed. C.B. C., 244; Brandin, For. Fl., 330; Dils. & Gibs., 145; Gamble, Man. Timb., 255, Kura. For. Fl. Burm., II., 195, Elliot, Fl. Andh., 17, 67, 160; Campbell, G.R. For. Pl., Chuta Ragpur, 49; Rheede, Hort. Mal., IX., 17; Grah., Cal. Bomb., Fl., 143.
	Habitat.—A climbing plant, met with throughout India from Kashmir to Assam, Burma, Coromandel, Travancore, &c., ascending the Hima-
FIBRE.	
2248 Medicine.	
2249	F
	A ST - AT B - et C
2250	
	the Santals rest on the "Doctrine of Signatures."
	CRYPTOMERIA, Don; Gen. Pl., III., 428.
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Caoutchouc-producing trees.

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Structure of the Wood.—White, soft, with a brown, often almost black, heart-wood; very uniform, with narrow bands of darker and firmer tissue at the edge of each annual ring. TIMBER, 2252

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CAOUTCH-OUC 2254

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2256

626

CUCUMIS.

The Cacamia or Melon.

likely to be commercially successful. The plant grows wild in the Western Chair."

Crystal Rock, see Camelian, C. 616.

CTENOLEPIS, Hoot. f.; Gen. Pt., 1., 832.

Ctenologis Garcini, Naul. ; Fl. Br. Ind., II., 630 ; Cucunstracex.

Vett.—Gudi muraid, Tri. References.—Revo., Fi., In L., Ed., C.B.C., 7037 Data. & Gibs, Homb. Fi., 507 Athinson, Kom. Prod., F., p. 11.

Habitat.—An annual climber, met within Bundelkhand and the Dekhan-Grows on rubbish heaps and hedgerous,

Medicine. -- Atkinson says the fruit, areds, and roots are used in medi-

Cubeba Officinalis, Miq., see Piper Cubeba, Linn.; Piperacex. Cubebs, see Piper.

CUCUMIS, Linn.; Gen. Pl., I., 826,

A grouse clambing herbaceous plants embracing some 26 species, of which hall are attract of Africa, a few occus in the tropical regions of Aira, Australia, and America; and severalists of doubtful origin though widely cultivated. Effect says the Telega word Hadron as a giptled generically to All species of Cultivaria. The botanical generic name (which was the Latin specific name for the Cultivariant) probably arose from curveys (Latin) in allisation to the shape of the fruit.

History.—Much confusion still exists regarding the Indian so-called
History.—Much confusion still exists regarding the Indian so-called
Reviews was the first author
an forms. In his
he regards as one

other genera, and the remaining seven reduced to three species. Do Dandolfe, however (Orig. Cull. Pl., p. 259), seems to be of opinion that they represent but two species—C. Melo, Lim. (embracing all the wild and cultivated Indian, African, and American forms of the Melon)

His words are: -- "No Sanskrit name is known, but there is a Limit natine, be the Latin melo." There are other vernacular names for most

seems probable that molant o from the English word melor pure names for the forms of th

those given by Wilson, Elliot,
The experiments of Naudin with the various forms of Cacarbita and
Cacarbits go some way towards establishing a physiological classification
of these plants. He concludes that where it is possible to cross fertilize

C. 2260

Medicine. 2258

2257

2250

HISTORY.

The Sweet Melon.	CUCUMIS Melo.
with the production of fertile seeds, the plants so experimented with may	HISTORY
	2261
cases, it is evident that if nearly allied forms can be crossed and produce fertile individuals, at be considered as a contest the value of a too liberal accept cross fertilization would materially upset many well established species. For example, it might not be difficult to show that many of the recognised and constant forms of cotton, grown in India, are hybrids between the species Gossypum herbaceum and G. barbadense. So also it is commonly stated that a fertile mule exists between the two species of Camel—Camelus dromedarius and C. backtrianus—but the progeny is more unmaningeable than the mule itself, and is accordingly very little bred (see article on Camel, C 203). But Naudin's physiological classification	
	2262
of Cucumis, Roxburgh's species have been retained (to a large extent) as the names of forms under the species established in the Flora of British India  [Mono Phanerog, III, 482; CucumbitAcere Cucumis Melo, Linn, Fi Br Ind, II, 620, Cogniaux, in DC., The Swfer Melon (Stewart and also Baden Powell call this the Musk Melon, but by giving it at the sametime the name Kharbura they remove the suspicion of Cucumbita moschata. The information furnished by these authors under "C. Melo, L—musk melon" has accordingly been compiled under this species).	2263
Vetta—Kharbiya or kharbiya, khurbiy or kharbiya, Hind, Kharmiy Beng, Tarbiy, Santra, Dingra, C. P. Kharbiya, Kharmiy Rept, 23), kharabiya, kharbiy, chibuda, Bonn, Chibunda, Mar, Tarbucha, C. 21.  "And Arju Villari-ter Elliot)," Tesems probable that in Bombay Tarbiya and kharbiya are applied to distinct forms of the nelson References—Robb, R. Ind., Fd. C.B.C., 701; Voict, Hort. Sub. Cal., 53; Thomatics, Em. Ceylon Pl., 177, Dale & Gibs, Bomb, Fl., 103, Sup., 37; Stearat, P. P. 195, Altchison, Cat. Pb. and Sind Pl., 61, 107, Orig. Call. Pl., 253, Naudin, Aim des Scien. Natur., 4th. Series, Vol. Al. (1689), 34; Stocks, Account of Sind; Campboll, Econ. Prod., Chuia Auspur, 63; Elliot, Flora Andanica, 83; Ainslie, Stat. Ind.,	

2 S 2

CUCUMISI Melo

The Sweet Helon.

Tree Acres 411

Habitat -1 stems sely cultivated on account of its fruit in the sandy bruns of titers. Said to be a nature of North Wes Index Billuchistan, and nest tropical Africa (DC). Ainsi e prote in 19.6 that C. Me'o "has been taid to be a native of Calmuc farrary, an op non adopted by Willdenow, in India it is cultivated by seed brought from Persia (see Turernier's Trivelein Perna, IV . Cast III where it is much prized and is called thurbeach. The Arabiara term it batich. The Dukhame and Hindustanic name is also khurburth, bara oy, also amigh s (Macar); molim fullum (Tast); for ne (Ir)" It includes numerous varetes which present differences both in shape, sue, and properties (For methods of cultivation see under a further paragraph. A good plate of this plant occurs in Outhie and Fuller & Field and Girden Crops )

Oil -The fluttened and elliptic seeds yield a sweet, edible ol fact, the seeds of most of the members of the melon, pumpkin cucumber, and gourd family contain of, but the only kinds which are utilised to any considerable extent are those of the Sweet melon (Cocumis Melo) and the Water-melon (Citrulius vulgaris) From West Africa large quantities of melon seeds are exported to France China also does a considerable trade in them, but in Ind a the fruit is chiefly eaten as such, and not allowed to ripen its seeds, and accordingly the supply of melon

oil is not extensive

Medicine -The seeds are used as a cooling medicine. They are edible, nutritive, and diuretic, and are given in painful discharge and suppression of urine. This may be said of the seeds of all the species of Cucumis, and it may thus be doubted if medicinally they are dis-tinguishable. The seeds of C. Melo, along with those of C. utilissimus, Benincasa cerifera, and Citrulius vulgaris are largely sold in mixture all The natives consider this combination cooling, diuretic and over India strengthening It sells for about 12 annas to one rupee a pound (Compare with the remarks under car utilissima)

Pulo 2267

OIL

2261

REDICINE

Seeds.

2265

Mixed seeds

2266

Special Opinions.—§ Brussed seeds applied to the abdomen in cases of tympanics in children" (Surgeon-Major F J L Ratton, M.D., M C. Salem) "Not only the seeds but the pulp of the fruit is a powerful diuretic, very beneficial in chronic, and also in acute eczema I can, from personal experience, recommend those subject to chrome eczema to eat a whole fruit daily when procurable The seeds, dried in the sun, keep

perfectly well in a bottle and should be used when the fresh fruit is not in season" (Civil Surgeon S M Shircore, Moorshedabad)

FOOD 2268

Food - from an agricultural point of view this is the most important species of the family It is extensively cultivated on the sandy banks of rivers Of the North West Provinces it has been said—' So soon as the sand banks are exposed by the falling of the river, operations commence by enclosing small plots with grass fences in order to protect them from the inroad of drifting sand. A plentiful stock of manure is then carried to the spot, and large holes dug at regular intervals throughout the plot, into which the manure is distributed. The melons are sown over the manure in the holes which act therefore in the same manner as This is the practice in growing melons in the beds of forcing beds rivers such as the Ganges and Jumna, which consist wholly of white sand Where the river deposit is of richer quality and contains a mixture of organic matter, a much less amount of manure is required, and it is

C 2268

The Sweet Melon.	CUCUMIS Melo.
reported that occasionally manure is altogether dispensed with. The melon beds commence fruiting in April and continue yielding until they are overwhelmed by the nise of the rivers in June "[Outhie and Fuller]. The area under melons in the North-West Provinces may be estimated at 23,000 acres annually.  In the Chandwara Settlement Report it is stated that melons are gentled to the chandwara Settlement Report it is stated that melons are gentled to the chandwara Settlement Report it is stated that melons are gentled to the chandwara Settlement Report it is stated that melons are gentled to the chandwara Settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandwara settlement Report it is stated that melons are gentled to the chandw	FOOD.
rct. It is also  it is said to  it as and to  it as and to  be plains, some  an and Jhang,  ian. Those of  t declares the  people fatten on them 'as horses are said to do in Bokhara.' Vigne	ĺ
it), several varieties of melon are extensively grown, and Davies' I rade Report states that 300 mule-loads are annually imported thence are large and in the sareda with the degenerate ount of melon tin which the so of a spherically sweetish and	
Caltivation.—Firminger refers to two good forms of melons, once which—the Afgham—has been alluded to above. He says "the kind which ranks as finest of all, called the turdah, is a native of Cabul, and has not that I am aware, been cultivated with success in any part of India." The seeds of this kind are at once to be distinguished from those cany other, being fully floor times larger." The next kind, second per haps only to the surdah, and superior to any other with which I are acquainted, is, believe, also from Cabul. Like the surdah, too, it is the green-flesh sort. It is of a large oval form, with very smooth, pale green exterior, traced here and there with a delicate network. The succeeded most satisfactorily at Perozepore, and was the one which in the surday of the sales may be known by the state of the sales may be known by the state of the sales may be known by the state of the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be known by the sales may be sales and the sales may be sales.	108 2270
by 1, the smaller of these melons may be grown to a size somewhat larger than large goose's egg, with a bright yellow rind. The flavour is slightly substitution of the state	227I

330	Dictionary of the Economic
CUCUMIS Melo.	Indian Forms of the Melon.
CULTIVA- TION,	system by which the Cabul meion might be grown. It was, however, troublesome and expensive though attended with success. The chief features of this system were the selection of an open situation even by growing in gumlahs on the selection of an open situation even by the holes to be 2 feet c apart; the compost with posed horse or cow manure and the remainder earth; to be sown in March, a great point being the steeping of the seeds in warm water for 24 hours; afterwards retaining them in wet ashes or a wet cloth until they sprout; as soon as sprouted to be sown about a foot apart and an inch and had deep, lastly, to be deluged with water every day from sowing until the plants are two inches above ground.
2272	Mr. Firminger comments on the watering that it should be withheld when the plants are in blossom, given freely after they set fruit, and with-
	sandy soil. French writers affirm that the fruits produced nearest the root are the best, hence a system of severe pruning is recommended, each shoot from the tap root being allowed to produce only one or two fruits. The melo " the the car beetle 's dust the plants with wood ashes. This must, however, be highly injurious, and since in most cases with age the plants cease to be attacked by the beetle a better course is to cover the seedling plants with a muslin frame. The following two forms are the cucumber-like plants which, by modern European botanists, are treated as melons, and are not even allowed the position of varieties from the type.
2273	(1) Cucumis Melo, Linn ; var, Momordica.
	This form does not appear to be referred to in the Klora of British India, but it is one of the most easily recognised of the conditions of C. Melo. It is the C Mc which by Gogniaux (in placed as a synonym alo Royle, under C. Melo, quite smooth, not fluted spherical-ovoid) but it is frequently mottled. As Roxburgh says, the plant is more like the cucumber than the melon, except that it is less
2274	i more nearly approaches the cucumber, and so is well worthy of the independent position here assigned to it.  There are several forms, but two are readily recognised—the one grown in the rains and the other in the hot season. The fruit bursts spontineously when spe; it is then from a foot to 2 feet long and from 3 to 6 inches in diameter, and weights 4 to 8h. The seeds are smaller than

Indian Forms of the Melon.	CUCUMIS Meio.
those of the common melon. A good drawing is given of the plant by Duthie and Fuller in Field and Garden Crops  Verm P' 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Habitat.—Cultivated here and there throughout India: Roxburgh remarks that in the Carnatic it is a cold season crop. According to Duthie and Fuller there are, in the North-West Provinces, about 600 acres	
and Europeans; when young they are a good substitute for the common cucumber, and when tipe (after bursting spontaneously) with the addition of a little sugar they are scarcely interior to the melon, and reckoned very wholesome."	01L 2275 MEDICINE 2276 F00D. 2277
(2) Cucumis Melo, Linn.; var. utilissima. Syn.—C Utilissimus, Razb Vern.—Kahri, kaim, Hind; Kakhr, or kintur (Kahri, according to Firminger), Bevo, Kuhri, Kangra (m Settl Rep., 21), Dorrey, relitra.	2278
Takhoo, BURM References—Road Fl Ind, Ed C B C, 701, Firminger, Man Gard in India, 128, Moodeen Sheriff, Supp. Pharm. Ind., 122, U. C. Dull, Mat Med Hind, 171, S. Aryun, Bomb Drugs, 59, Baden Powell, Fo Pr. 475, Birdrood, Bomb Pr., 126	
Permates, There are not to the state of the	DESCRIPTION 2279
to cook green to really wind, usually endinging to a tright orange colour when tipe. The seeds, like those of phunt, are rather smaller and more slender than true melon seeds. Firminger describes the fruit as a	Seeds. 2280 Fruits. 2281
(Loni with a further para on cultivation)  Habitat, -Cultivated in Bengal, the North-West Provinces, and the Panylls during the hot weither and the rains. "The fruit varies from Panylls during the following and is either straight or curved like some varieties of cucumber. It writes in colour from dark green to nearly white, usually changing to a bright orange colour when net (Duthir Ch. 2281)	-

<b>~</b> 54	Dationary of the Economic				
cucumis sativus.	The Cacumber.				
FOOD.	her of a creamy- ha rusty brown, ranges from 15 acres in Mecrut to 153 in Budaun and 183 in Allahabad (Duthie and Fuller). The rainy season varieties are the most common, and are universally				
2202	eaten by natives of all classes as well as by Europeans. The other varie- ties are also used as food, being either raw or cooked in curry; the small hot weather kind, and those grathered in a young state, and known as gherkins, are made into pickles. It may here be remarked that the				
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-					
	Consequence of the control of the control of the control of the co				
	by those who may have the opportunity of doing so, and Naudin's experiments in cross fertilizing the two forms of cucumber alluded to above of carefully died specimens				
CULTIVA- TION, 2293	to by many writers, but it is scarcely necessary to repeat all their statements. The following abstract from the Indian Forester (written by Mr. Gollan, Supenntendent, Botanic Gardens, Saharanpur) gives some particulars regarding the cultivation of hot season cucumbers or gherkins:—				
	"This is a variety of the common cucumber, with small egg-shaped fruit, and is also a true hot season vegetable. In order to keep up the supply until the beginning of the rains, three sowings should be made, one in the end of February, one in the middle, and one in the end of March It will succeed fairly well in any soil, but prefers a rich one. The seeds should be laid out in drills, one foot apart. The seeds should be sown along both sides of the drill, and it the soil be dry, water should be given immediately after sowing. After germination, water every ten days, but like the kakri this vegetable should not be watered too often." (Vol. IX, 162)				
	Regarding the rainy season forms Mr. Gollan (Ind. For., IX, 201) says they have much larger fruits and are more like the English cucumber; there are two forms,—"when in a young state the colour of one is a dark green, and of the other creamy-white; when full grown, both are about a foot long, and the colour changes to a rusty brown. These two, although not equal to the commonest varieties met with in England, are not to be despised. They thrive with little care and are always sure of yielding a crop."				
2294	mways sure or yierumg a crop.				
- 1	, a				
	ids he				
ļ	ch				
,	Ç. 2294				

	CUCUMIS
The Cucumber.	trigonus.
way it affords a very delicious dish during the rains, when so few other	CULTIVA- TION.
own in October it may be made to yield. This is a point or some interest, since, if derived from the Indian wild stock, cultivation in Europe has completely changed the character of the plant. A writer in the Agri-Horticultural Society's Journal (IV, 21) says, however, that in importing seed of cucumbers, only those grown in the open air should be got; frame cucumbers are useless for India.	2295
*	
appear io be ill-suited to this country."  Domestic and Sacred Uses — Alkinson remarks that "the juice is said to banish wood-lice and fish insects by strewing freshly-cut slices in their baunts." At page 371 of Vratráj it is related that Suth told the Kushis, and Shin told his wife Paratati to worship the plant, as by doing so females do not lose their husbands, or that these survive them. The fruit is cut into thin slices and employed in the worship of snakes on Shravan shudh 5th (Naganchim day). It is likewise employed in the worship of many other gods." (Lisboa, U. Pl. Bomb, 285).  C Hardwicku, Royle, has been alluded to as most probably only the wild state of the cucumber. At the same time it bears separate vernacular names and is collected and sold for so very different purposes that it deserves an independent notice. It is known as the air-alu in Kumdon particle.	DOMESTIC, 2296
	0307
bably the Kirbut of Sind, the dried fruits of which are considered emetic, and in small doses are given to children along with honey as a useful stomachic. (Conf. with account of T. trigonus, form pseudo colycumbia.)	2297
Cucumis trigonus, Roxb , Fl Br. Ind , II , 619	2208
Syn — C resudo-colocinthies, Royle, C Turbinnatus, Royle, C Ander-Asynamus, Royle, C Millo, Linn, var. Acrestis, Naud, C Full-ESCEAS, Wall C ENICARPUS, Bosso, Bryonia Calloda, Herb Rottler These are the synonyms given in the Flora of British India, but practically all the names given by the old authors for the Indian so called wild species of Cucunis, are now reduced to synonyms of C trigonus, Royle been since advanced by Gog. III, 482), where certain of the others left under C trigonus.	
C. Melo, Lann	2299
Var a agrestis, Naud; SNN C Melo, car Pudescens, Kura (Trans. And Soc Beng, 1877, par.; s. Naudon, 1872, Prod. 1, p. 32. Wight, 1 C MADERASTANLS, Rock Jour of Bol. 4, p. 149, C non-Road.	
Var. β culta, Lurs, Syn C Dudain, Linn, C Plexuosus, Linn; IV. & A Pred, 342, C AROMATICUS, Royle, Ill Him Bot, §1 2, § 220.  C. 2299	

CUCUMIS trigonus.	Wild Forms of Cucumus
2300	C UTILISSIMUS, Roxb , W & A , Prod , 342   C MOMORDICA, Roxb , (Conf with syns given under C Meio & C Sarivus)  If this view be accepted a certain amount of countenance might be inferred as given to the possibility of C Melo, Linn, having been derived from some other plant than C trigonus. The Indian wild plant, which perhaps most nearly approaches the melon, is that described by Roxburgh as C maderaspatanus, and by Wallich as C pubescens. But the subject is too complex for the writer to deal with it at present, further than to exhibit the opinions of the most recent authors. It may, however, be added that the natives of India recognise as distinct many of the plants indicated by the above botanical names or synonyms. Without attempting to dispute the conclusions arrived at by systematic botanists, it may therefore serve a practical or industrial purpose to refer to some of the old Roxburghans species and to give the various vernacular names that are in use for them in Indian the state of the properties. It may following forms may mus, and some of the old with the production of C, Melo, provided the claims of C maderaspatanus, Roxb, be excluded from consideration, as the wild state of C. Melo, proper
2301	1 Cucumis trigonus, Roxb
2302	Vern.—Pam budinga (Roxburgh) and Pulcha (Elliot), Tet.  Botanic Diagnosis —This, as Roxburgh says resembles most nearly C utilissimus It is never cultivated nor is it eaten. The first is oval smooth, dist actly three saded, with the angles round and the surface streaked, with ten light and ten deep shades of yellow.
01L 2303	Habit I Reams   Central Provinces and to Oil   1 ng, which is used for lar   1 ng, which is that it is used for burn ng in Jamps in some parts where the fruit abounds   1 ng   1
2304	2 C turbinatus, Roxb Vern -Nulla budinga (Roxburgh) and nalla budama (Elliot), Tel.
2305	Botanic Diagnosis—It is very much like C trigonus, but the leaves are more deeply 5 lobed and the segments bristle toothed. It is at the same time a smaller plaint, with larger flowers and a pyr form maculated 3-cornered, smooth fruit, which is regularly eaten. Habitat.—According to Boxburgh this is a native of the same region as C trigonus, and it is probably only a form of that flant and sem-cult vated.
2306	3 C maderaspatanus, Roxb  Syn.—C rubescens Well  Vetu.—Ban gumah, gomuh Benc. Takmaki, Bonn, Chiber, Sind, Aachri (Stewart) Aakri (Baden Powell) but Aakri usako C util- issignus in the ianjah Aadi bu-dinga (Aadi bu Jama, according to Elliot, who calls it also Fowl a Cucumber) Tet., Gang kahiri, Sind i Garakhi crikikamu (Elliot), Godumba (Dutt) Sins  Batelo Dagmonia —The salmost intermediate in tyre between C Momor-
2307	dies and some of the forms of C sativus The leaves are less deeply lobed than are

Wild Forms of Cucumis,	trigonus
those of C trigonus or C, turbinatus, and an fact are almost renform and often	
Bombay, and Sind sold is the markets.  The fruit in food by the natives and muc in food by the natives and muc in food by the hard. Atkinson states of the North-West Provinces, that "C. pubescens, the kachri and bar-namnah of these provinces, occurs wild, and is occasionally cultivated and eaten raw or cooked. Stewart remarks of C. pubescens (kachri) that	2308
	MEDICINE,
pubescens, umonly used as **c cucumbers been beaten t. Cucumis pseudo-colocynthis, Royle.	
Syn — C. Pubescens, Willd; C. ERIOCARPUS, Boiss.; C. CICUTRISATUS, Stocks.  Vern.—Indrayan (= colocynth), bislámbhí in Northern India (O'Shaughnessy); Kart, Bons; C Hardwickii (see ante) is known as pahár, indrayan, Bonsbeskinaho; Bislambhí of the baisars, N.W. Provinces.  Moodeen Sheriff gwes the South Indian names for what appears to be this plant—Hatthi-timathit, That, Adam-pubched, Tet.	2310
Botanic Diagnosis - A prostrate, very scabrous plant, with gland-like hair bear-	2311
	MEDICINE. 2312
· · · · · · · · · · · · · · · · · · ·	
bay Presidency. The fruit is of the size and shape of a small egg, and marked with	

CUCURBITA The Pumpkin, Squash or Red Gourd. maxima. latter in a paper which Balfour says appeared in the Agri-Horti, Soc., Proc., 2314 CUCURBITA, Linn.; Gen. Pl., I., 828. 2315 The ver with Gourds. than has been It seems intery trul in forms met . . moschata, and C. Pepo most provi . the most abundant. It has been found impossible, however, to furnish a satisfactory account of each species, and the information given below, as well as the vernacular names, will most probably have to be materially re-arranged, in which DeCandolle seems y be a truly Asiatic species and the origin of "the pumpkins cultivated by the Romans, and in the Middle Ages" in Europe generally; but that Cucurbita Pepo is most probably a native of America, having been the source of all the American gourds and pumpkins that existed anterior to the discovery of America. M. DeCandolle has not ventured to assign a habitat for moschata, although he states that all writers on Asiatic and African . 3 -- 3 .La. " Its cultivation is recent in China, e species. No Sanskrit name is - --- nuher very nunt seems to be · pics" (\$ 257). literature re-DeCandolle's grown, but the while those for C. Pepa are referring to Benincasa cerifera, · .arú. Cucurbita Citrullus, Linn.; see Citrullus vulgaris, Schrad.; Cucurbi-[TACER. C. 1221, C. lagenaria, Linn.; see Lagenaria valgaris, Linn. 2316 C. maxima, Duchesne; R. Br., II., 622. MELON-PUMPLIN, SQUASH GOURD, RED GOURD, The name Gound is sometimes given to the fruit of this plant, but that is more correctly the name of Lagenaria vulgaris.

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С. 231б

The Squash Gourd,

-- - - - - - - - seering of Cucuretta. He says that Bagald does

CUCURBITA maxima.

- Facto does and

Botanic Diagnosis.-Leaves, 5-palmate; lobes rounded, sinus, nar-2317 row; petiole, nearly as long as the blade, not prickly; fruiting peduncle, round smooth; corolla lobes, curved outwards; calyx segments, lanceolateinear. 2318 Habitat .-- C of the globe. as the musk-me find either C. 1 2310 the other hand **₁ C " regarding the species grown in their Atkinson, Dutt, and several other authors con-Sourd (Benincasa centera). dil. to the oil as a nervine tortic. 2321 (Honorary Surgeon P. Kinsley, Chicacole, Ganjami, Vine " , raili-tioner," August 1878, Vol XXI., p 128, quoting " Medical Examiner," June 13, 1878 "The dose recommended is an ounce and a half beaten up with sugar. I have tried pumplin seeds such as are sold in Calcuita as a Li- +wb for 5 ounces [Note uld most probably appear under C. Pepo -Ed 1 Food .- This plant produces the largest known eucurbitaceous fruit, in

some cases weighing as much as 21th, and measuring meatly B feet in circumference. The fruit is wholesome, and when young is used as a vegetable. It is sweetish and yellow. When mature it will keep for many months it hung up in an any place. It is largely used by natives of all classes in curry. "When very young and tender it may be employed as a pleasant vegetable for the European table, by being boiled, press.

CUCURTITA morchata.

# The Mark Melon

eld an to reits title water, and errord warm, with timer, ealt, and propertitle Into tarth.

"Mr. Golfan us refired to (pumper) Cocurb to maxima" i) it there are several states of the plantion in outly used in our any server are ctalled. The common to have a large gift like ground and of a linear which is the first given from the state warrant in the first given from the safety very year. The reside should be such from April to Jame. The plant refers very in head and the general residence in the old and the grants are plantiff with the came as that it legionate arights (the A).

2323 | k+/i+1"

Firming the transfer of the "Red Gourd" or sufurishings, also Libberton, "that it is a trisomologist, of historial prof. (Innotised bad Gourd of on moorie encours encours extendenten such superiorishing for an interest of the line in the surface where this cut up and soft in a very in my opinion the most appearance of this or. An annual seed when in the rains suggestible in use during the cold seasons not considered that formal manual seed when in the rains suggestible in use during the cold seasons not form cultivated in printens. It may be suspected that Firminger alfudes in the above to C. moschata (forma Molopeno, R. 24), and not to C. maxima.

5357

The confusion between this feat and that of the common Gourd (Lagrania wilpain) should be purated against. Not Indian writer seem to prefer to call C maxima the Gourd, and Lagrania wilparis the Bottle Gourd. In the Settlement Report, Kurrhon District, "Countrita maxima (pumpkin)" is called Guids, Hisso. In another part of the same report and under the same scientific name occurs Turk 165, 11140, while "Cucuritis Pepa (Pumpkin)" is called things, Hisso.

2325

Cucurbita moschata, Ducheme; Fl. Br. In1, 11, 622
The Misk Meton, Eng.; Potikov, Fr.

Syn -C Mriorero, Rord

Veta -Sitaphal, saphari kumbra, kumro, kaddi, mitha kaddi, N -W. P.; hali-dudhi, Bouta

2326

2327

cles of the temale flower large followers.

There are two primary forms—one with the fruit smooth but motified the primary and the fruit tor-

brown and y

blec

lose or flute

Habitat — in by the natives nooth and some-

ted and fluttened spheroidal It lopepo of Roxburgh) is by many Indian writers described as C maxima. The long account given by Firminger (Van Gar for India, 125) under the heading "C Melo-

Firminger (Uau Gar for India, 126) under the heading "C Melopepo, squash" his reference to imported seed of Squash, Gourd or Vegerable-marrow, and not to the Indian cultivated fruit, C moschata. Property of the Company of the Com

Messrs Duthle and Fuller (in Frid and to LA) give an account of Cucurbita moschata, but do not mention any facts regarding method of cultivation,

2330

2331

The Pumpkin or Vegetable Marrow,	CUCURBIT Pepo.
season, &c. They state that only the Cucurbita there figured appears occur in the North-West Provinces. Their plates seem to represent torm Roxburgh called C. Melopepo and not his C. moschata proper the idea be correct that the fluted fruit is C. Melopepo.  Oil—I he seed yields a mild, bland, pale-coloured oil Food—The yellow flesh of this fruit is extensively cooked and eater a veget-tible throughout India. There is what appears to be a forn this fruit grown in some parts of the Panjáb and North West Provin and known as tendás of Bipnor and tindu of the Dubb (Alkanos), it of the Panjáb Regarding tinda Mr. Baden Powell says. "tindu (Col that tobata I), a smill round gourd, when young, at which time it make the colour of the panjáb regarding tinda Mr. Baden Powell says." tindu (Col	the c, if oil. 2328 Food 2329 and cers and correct cor

tindi Cucurbita Pepo, DC.; Fl Br. Ind., III, 622.

THE PUMPKIN, VEGETABLE MARROW.

Syn — C Pero, Read Roxburgh included this plant (the pumplun) as well as Benincasa Cernfera, Son (hard and a) 2 Arkingan, Dona, Dutt, Mc mistale stamens —

most delicious vegetable for the table, the fruit is not bigger than a small turnip" The writer saw in the Naga hills a form of what appeared

C. Melopepo which would have answered to Mr. Powell's description of

anthers not united in Cucurbita, the stamens are inserted below the mouth, and the anthers are more or less united. The fruits of Benincasa are cylindrical, t-t] ft. long, without ribs, at first hairy, then

curbita Pepo, Lim' is the Patis gammadi, and dedadegammadi, Tet., and Sir W W Hunter that it is the Patis dedadegammadi, Its impossible to separate the vernacular names which belong to this plant from those applied to Bennicasa cerifera (Conf. with that species, B 430) Moodeen Sheriff, for example, gives under C. Pepo, Rosb, a long ist of names, most of which in all probability, refer to Bennicasa cerifera, he Sanskirt name Awshpandado or rather Kenkmanda certainty

Botanic Diagnosis -- Leaves 5-palmate, sinus, broad and segment pointed, petiole as long as the blade, the hairs of the lower surface

allowed to spread over the roofs of their bouses

01L 2332

tricts, says the leaves of this plant, as also of C maxima, are used as external applications for burns

2333

CUMINUM Cyminum. The Pumpkin or Vegetable Marrow.	
MEDICINE. Special Optolone 4 "Ti a con in con and alministrant	
FOOD. 2334  a similar crystalline substance "(Prof. Warden, Calcutta). Food.—Very little more can be learned regarding the has been given above. It is very much to be feared that me the subject have not only confused this fruit with that of fera, but also with Cucurbita moschata. An Official Note of	e pumpkin than iny writers on Benincasa cen-
•	
Rolled. 2335 1	
There are two varieties of this plant growing and used in the but differing slightly, one called boga kumra, and the other or chalk kumra. It is to be feared this passinger refers to electrical or Cucurbita moschata. The writer does not recoile C. T.	r ranga kumra ther Benincasa
	Under the kúmara, Bijnor," iteresting cerifera: "A
2337	rposing it to
DOMESTIC 2338  Domestic and Sacred Uses —The Vrat Kaumuda recomm ship of this plant, considering it a goddess "Dharmág'i and Narad priest of the gods tells King Chandrasen, to obsoft this courbitaceous plant (vada pag 270 of Vratra) in self from Padma Purán) Its fruit is also cut with some cere kohala mulhurt, a day or two before a marriage" (Lisboa, U 285).	ells Arishna,
CUMINUM, Linn; Gen. Pl, I, 926	
2339 Cuminum Cyminum, Linn; H. Br. Ind, II., 718; Un	MBELLIFERÆ.
Cumin, Eng, the Κύμινονημερον of Dioscorides, Horace and Persius	CUMINUM of
Vern.—Zira, Hind, Jiraka, jiraka or ajāji (Ainsli	e), "Jiraka, 1, Gz., Jire 1; Shiragam, 1rage, Kan
- the vernac lar nam	es for this
Habitat —More or less cultivated in most provinces of I perhaps Bengal and Assam. There seems no doubt the p native of India, Roxburgh is silent on this point, but Ainslie,	lant is not a
C. 2339	

### The Comin

CUMINUM Cyminum.

2340

OIL.

234I

MEDICINE 2342

about the same period says of the Calcutta Botanic Gardens (which were then under Dr. Roxburgh) that "the plant, however, is growing in the Botanical C making t

personal speaking the plant is a native of Egypt, but is cultivated now in India, though I am inclined to think that the greater part of the seed found in

that the greater part of the seed found in

Andreas Anno 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1900 an 1

and and, the quantity seems enormous. The same authority also gives 25 maunds as exported by that route. Atkinson makes no mention of in his Cata-ape in Fe-file North-at the plant

common that with a first and a second

References -Rosb, Fl Ind, Ed C.B.C., 271; Voigt, Hort. Sub. Cal.

Oil.-A medicinal oil is prepared from the seeds (=fruits).

Medicine.—As a medicine Cumin seeds are considered aromatic, carminative, and stimulant. They are also stomachic and astringent, and useful in dyspepsia and diarrticas. The Pharmacopera of India stys:
"The fruit, officinal in the London Pharm., are met with in bazárs throughout India, being much in use as a condiment. Their warm bitternsh taste and aromatic odour reside in a volatile oil. Both fruit and oil possess comparations of the property of the propert

e amongst and as 4 seasoner tot their curries "It is thought to be very cooling, and on that account forms a part of most prescriptions for gonorrhoza. It is also used as an external application to allay pain and irritation. Arabian and Persian writers describe four kinds of Kamin, view, Farsi

C. 2342

2 T 2

	- managed and managed
CUMINUI Cyminun	
HEDICINE.	Special Opinions § "T"  round worms though uncer  B.A., M.B., Monghyr), "4  crystallisable vanety of alb  a similar crystalline substa
F00b. 2334	Food.—Very little mor
Rolled. 2335	t is eaten, cut up into small preces and or freed in oil. The young tops of the tender shoots are also sometimes fined in oil or boiled in khar mater. There are two but differing or chal Lumra citifera or Cu hayng
Twigs. 2336	also is the fact that the young tags are eaten as a pot-herb Under the names "C Pepo, DC, pumpkin or white Gourd-kumhra, kumara, in landa and kaddu safed of Bipon,"
Sherbet. 2337	t certerat: "A exposing it to
DOMESTIC 2338	shi shina, an of the work of the work of the work of the work of the with some ceremons, called kohala mahari, a day or two belove a marriage "(Lisboa, U. Pl. Bomb, 285).
	CUMINUM, Linn; Gen. Pl, I., 926
2339	Cuminum Cyminum, Linn.; Fl. Br. Ind., II., 718; Undellifere.  Cunin, Ling., the h διμανοτημέρου of Dioscorides, Cuninum of Horace and Persius.
	Vern.—Zird, Hino, Jiroka, jiraka or ajdji (Ainsile), "Iraka, jiraka (Elikol), Sans; Jird, Bing; Jira, Jirakim, Ge.; Jire aira (Elikol), Sans; Jird, Bing; Jira, Jirakim, Ge.; Jire aira Man, Kaman, Arak Zira, Pers, Zéro, Sing; Shirgam, Tam; Firaka "jilakarra" (Elikol), Tel; Jiringe, Jirage, Kan,
	rthis
	Habitat — More or less cultivated in most provinces of India, except perhaps Bengal and Assam. There seems no doubt the plant is not a native of India. Roxburgh is silent on this point, but Ainslie, who wrote C. 2339

044	Dictionary of the Economic
CUMINUM Cyminum.	The Cumin.
MEDICINE.	or Persian, Nabit or Nabathean, Kirmáni or black Cumin, which they say is the Basilikon of the Greeks and Shánd or Syrian. They consider it to have the same properties as the caraway "[Oymock]. Dutt says that the Sanskrit authors recommend "a poultice made of cumin seeds with the addition of honey, salt, and clarified butter" to be applied externally for scorpton bites
	Special Opinions.—§ "Used as carminative and stomachic, half drachm Saha- reg- "Sa-
CHEMISTRY. 2343	cre- cre- cre- cre- cre- cre- cre- cre-
	red to is likely to be in the hands of the student of Indian Materia Medica Professor Warden has, however, contributed the following brist note for the present publication:—  "The fruit contains an essential oil, which is a mixture of Cymol and Cummol, and other hydrocarbons. Cymol is also a product of the dry distillation of coal tar."
F00P. 2344	distination of courter.
TRADE. 2345	the natives  Trade.—Cumin (or Cummin) would appear to have been known to the ancients; at least there are names for it in most of the classical lan- guages. During the middle ages it was one of the most favoured of spices. In one instance it is recorded that during 716 A.D. an annual provision was made for 150% of Cumin for the monastery of Corbie in Normandy. Similar records might be quoted from the literature of most European countries down to comparatively modern times. It was in frequent use, for example, in England in the 15th century, and in 1455 was one of the articles of which the Grocers' Company of I ondon had
Foreign Trade. 2346	the weiging and oversigne.  At the present day the European demand has greatly declined, the place of Cumin having been taken by Caraway. England receives her supplies mainly from Maita, Sicily, and Morocco, only a small amount being obvained from India. According to the returns of Scaaboor Crade issued
2347	separat sorts" was rer Sca-borne Trade as issued by the Local Governments, State North Sca-borne Trade as issued by the Local Governments, State North export of Cumin from Bombay in the year 1879-73 was 6,766 cwt., and acoto ext. from Calculat in the year 1879-71." These are insteading quotations, since only about one-fourth of those amounts left India, the remurder represented the coasting traffic, and hence a further error, since some of the coasting imports into each of the ports named would have

	JPRESSUS unebris
therefrom Thus of the exports ier Indian ports, nearly 2,000 out nust have greatly influenced the Bombay exports of the year. These remarks have been considered necessary owing to its being customary to find India assigned a far	TRADE. Foreign Trade
larger share in the world's trade in Cumin than is justified by the official returns. An analysis of the figures for the year 1857-576, compared with those for 1886-87, will remove this misconception. Last year the total exports were — Indian grown. Cumin 9.051 cwt. + foreign imports re-exported 1,260 cwt, or a total of 10,371 cwt. This amount was valued at R1,41,486. In 1875-76 the total exports were 8,120 cwt, valued at R9,4,019. The foreign trade in Cumin has thus slightly improved, but it falls far short of what most readers would infer from the amounts quoted above as exported from two of the Indian norts.	
Of the foreign imports, India received in 1875 76 only 538 cwt, and last year 9,020 cwt, so that deducting the re-exports, 760 cwt was thus added to the amount locally produced in 1856-87. But of the foreign imports 1,991 cwt came from Persia and the remainder from Turkey in Asia going to Sin Bomb "as 550.	2348
cwt. Arabia and East coast Africa each received a little over 1,000 cwt, France 430 cwt, and the United Kingdom only 95 cwt	
The Indian internal trade in Cumin must be at least four times as extensive as the foreign, but the ramifications of road, rail, river, and coast-wise-borne traffic are	Internal Trade. 2349
an idea of the actual ever, be stated that, j to consume more than	
than can possibly be produced in the Lower Provinces would seem to point to the North-West Provinces and the Panjab as the chief seats of Indian production, the railways carrying to Calcutta a large quantity, a portion of which is shipped to Madras to meet the South Indian market	
Dr Dymock says of the Bombay traffic in Cumin that it "comes from Jubbulpore, Guzerat, Rutlam, and Muscat Value, Rutlam, R8 to R9 per Surat maund of 37½ B., Muscat R6 to R6½, Guzerat, R3 to R7½, Lubbulpore, R3 to R6.	2350
Domestic and other Uses —By the ancients smoking Cumin seeds was considered to produce pallor of the countenance	DOMESTIC. 2351
Cuprea Bark, the bark of Ramija purdicana or R pedunculata, see Cin chona, C 2152	
CUPRESSUS, Linn; Gen. Pl, III, 427.	
Cupressus funebris, Endl , Brandis, For. Fl. 534. Gamble, Man. The Weeping Cypress	2352
Veru.—Chandang, tchenden, Buutia	l
Habitat.—A handsome tree with pendulous branches, and a fibrous brown bark, often planted in Nepal, Sikkim, and Bhutan, near temples and monasteries, and in China (Gamble).	

CUPRESS	
torulos	a. The Oypiess.
2353	Cupressus glauca, Lam  Habitat - Very generally cultivated in Western India above the
2354	Chats (Datz & Gibs, Bomb Ft Supp, 83) \ C. sempervirens, Linn.  The Cypress
	Vern — Sara, Saras, N. W. India, Farash, Sind, Saráboke, Mar. References — Rosb. Fl. Ind. Fd. CR. C. S. V. M. H. C. C. I. 558, Brandis, Pl, 222, Brow S. Arjun, Bom Provell, P. D. 657, Kew Off ( Gardens and Arboretum, 131  Habitet — A. I.
MEDICINE	West India, som in height. Aitch tree near the shrine at Shálizán. Medicine.—Wood and rhuir are regarded as astringent and anthel-
Wood 2355 Fruit, 2356 TIMBER, 2357	minte Structure of the titled to the structure of the titled to the structure of the struct
2358	C. torulosa, Don
	Himalayan Cypress
ļ	Veta — Devi-dier, Ravi, Dedar, Kutu, Bhajii, Guila, guira, kallain, Simia I fearin, Jaunsar, Rauska, saras, Kumaon, Sarie, serahyu, Tiber References.— Voigt, Hort Sub Cal., 588, Brandis, For Fl., 533, Gamble, Man Timb, 410, Dals & Gubs, Bomb Fl., 63, Stewart, Fb Fl., 222, Indian Forest, Y. (1833), F. 53, [1884, pt. 32, XI (1873), f. 53, Badan Front, Fr. 1874, Y. (1834), F. 53, [1884, pt. 3, XI (1873), f. 53, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr. 50, Fr
resin 2350 Timber 2360	very fragrant, moderately hard. Has been much used at Numi Tal for building, and is sometimes used for beams on the Ravu and Sutley. In Kula it is made into images, and is used for the poles which carry the sacred ark. It is often burnt as meense in temples. The Indian Forester (Vol X, 6) gives the following analysis of the ash:  Saluble potassium and sodium compounds phosphases of too, radium, &c 0.07 Calcium carbonate 0.044 Magressum carbonate 0.045 Magressum carbonate 0.065 Shies with sand and other impurities 0.067

CHPRUM. Copper. CUPRUM or COPPER. Cuprum : Man. Geol. Ind., III., 239, IV., 4. 2361 COPPER; MINERAL DE CUIVRE, Fr.; KUPFERERZ, KUPFER BLENDE, Germ.; MINERALE DI RAME, Ital. Vern.—Tanbah, tánbá, támá, Hind., Dec.; Tama, Beng.; Támra, Sans.; Trambá, Guz.; Támbra, Kan. & Mar ; Nohas, Arab.; Mis, Pers.; Shenbá (semba), Tam.; Rág., támramu, shenba, Mal., Tel.; Kaiyen, Bugn.; "Zangs, Bhotz; Mis, Turki; The Sulphale Nila-táya, PB.; Nila-thokar, BHOTE; Dina-farang, TURKI (Dr. Aitchison.)" References .- Pharm Ind., 378, 393-395; Ainslie, Mat. Ind., 504-508, Ure, Dic. Indus , Arts and Manu . . Madras, 27, 45; Bomb Gas., V., 123; . Brass and Copperware, Punjab, by D. Consult also the numerous publications referred to by Ball (Man. Geo. Ind , III., 611). DISTRIBUTION OF COPPER ORES IN INDIA .- The following brief note DISTRIBUhas been furnished for the present publication by H. B. Medlicott, Esq, F.R S .: "The most widely-extended copper deposits at present known 2362 to exist in Peninsular India are in the district of Singbhum and the State of Dhalbhum, to work which, Companies have several times been started and given up again. At Baraganda, in the Hazaribagh district, there are copper ores and traces of old workings; and a Company has recently been started to work these ores In Rapputana, copper ores are found in several of the independent States, and in the British district of Ajmír mining has been practised on a large scale, but is now almost extinct. In various Provinc cessfull would was opened some years ago opper ores which occur are o known to exist and to have tricts of the Madras Presidency." For detailed information regarding the Indian mines and sources of 2363 copper ore the reader is referred to Ball's account in the Manual of the Geology of India (Part III., pp. 239 to 280) With a work already in the hands of the public which disposes so fully of the subject it would be superfluous to give here what at most could be but an abstract of

number of people With the appliances presently used by the native miner the access of water has always proved fatal to extended operations. EuroCUPRUM Copper. DISTRIBUpern companies have several times been statted but soon il probed, and TIOY. it would appear that the hope of Indiracopper in a where int' e improvement of native means and app' ances Ball states : " The copper over of Peninsular India occur both in the older crystall ne or metamorphic ricks and also in several of the groups of transition rocks, as, for example, in the Cuddipah. Bijanar, and Arnali groups. In extra per nutice find a they are found for the most part in highly metamorphosed rocks, the percese age eclations of which to those of ill personals are not in all cases clearly made out as yet. "The ore of most common occurrence is the copper or pyrites, but 2361 towards the nutcrops it is commonly altered into carbonares or oxides. The associated minerals are in general identical with those which are found under similar elecumstances all the world over. Recent analyses by Mr. Mallot have tended to clear up much of the uncertainty which allacted to two minerals which were found in Indian copper mires, and were supposed, by those who first examined and described them, to be worthy of specific distinction; these were called respectively Mysoria and Sycocorite As a rule, to which there are probably not very many exceptions, the copper ares of India do not occur in true lodes, but are either sprusely disseminated or are locally concentrated in more or less extensive bunches and nests in the rocks which enclose them; occasionally cracks and fissures traversing these rocks have by infiltration become filled with ore which thus resembles true lodes. In not a few cases it is beheved that the ores exist only as the merest traces. ... At the present day, the extraction and smelting of copper ores are only carried on in the most petty manner. In the majority of cases the miners are unable to cope with the water which floods their mines, and, in spite of the fact that their earnings are small, the copper which they turn out cannot be sold at a price which would enable it to compete at the regular markets on equal terms with metal imported into India." Mr. Mallet writes : "Perhaps the most remarkable specimens of native copper hitherto found in India were those obtined in Kashnir, from the lower part of the Zinskar river, where it flows through tertiary rocks. In 1876, steral water-worn masses of pure metal, reaching up to 22D in wight, were discovered in the off pure stream, and were subsequently, when in the poissession of the Governor of Lvdikh, seen by Mr. R. Lydekker There is a specimen in the poissession of the Covernor of Lvdikh, seen by Mr. R. Lydekker There is a specimen to the control of the Covernor of Lvdikh, seen by Mr. R. Lydekker There is a specimen in the Geological Museum (weighing about 21 oz) cut from a lump of some 20lb. Although nearly all solid copper, it includes a little cuprite, especially on the sides of one or two cavities; 120 grains of the metal was tested for silver and found to contain a minute trace only. The source whence the nuggets came has not been traced; but recollecting how frequently native copper is connected with trappean rocks, as in the well-known Lake Superior mines, the conjecture may, perhaps, be hazarded that the vicinity of the trappean intrusions which occur between the tertiary and the carboniferous strata of the Markha valley, is one of the most likely localities for the copper to have been washed from."

FOREIGN TRADE 2365

FOREIGN TRADE IN COPPER -The imports in 1886-87 of copper ore, old copper, unwrought and wrought copper, amounted to 615,049 cut, valued at R1,99,40,085. For the past 20 or 30 years the imports of copper have steadily increased with the increased agricultural prosperity of the people, but within that period they have borne a marked relation to the fluctuations of agriculture. In the year 1835-86, the imports amounted to 632,073 cwt, valued at R2.09,38 405, and in 1838-83, they were 450,098, valued at R1.03,83,758. Mr. O'Gonor, in his Review of the Sea-borne Trude of India for 1834-85, says . "The price of copper has for some time been constantly declining in England. In January

Copper Sulphate.	CUPRI Sulphas,
than 12 per cent, below the lower piece throw, and authorities safe and moderate price. This define to the safe and moderate price. This decide the production in the United States, and it would seem to those who are in a position to estimate the conditions of future production there and elsewhere that prices are formed to the safe and moderate price. This decline is due to a greatly increased production in the United States, and it would seem to those who are in a position to estimate the conditions of future production there and elsewhere that prices must continue permarently on a low level. In Calcuta, where that prices must continue permarently on a low level. In Calcuta,	FOREIGN TRADE.
Australian copper was quoted at R31-12 in January 182, and at has fallen persistently since to R24-10 in January 1885. Over 50 per cent. theree-fourths is severy year this trade is, the fallen persistence of the fall of th	2366
Cupri Sulphas.	2367
COPPER SULPHATE OF BLUE STONE.	1
Vern.—Niloskisha, nili taid, mildishiya, liyn); Miristid or mhiristid, Dre. j. Miristid, Ozer, Teitzid, tuta, Bran J. Tulchkhanyanam, tetha, Sans, Mayit tultam, turchu, tuttam-turchi, Tan; Mayit tuttam, turchu, Malittid, Kan, Zajul athasir, siye athasir, qalqand, hani, Zale sabi, Pers,; I almanikam, Sing, Osuthi, Burm, Jan; Malay.  References —I harm Ind., 378; Wooden Sherif's Suift to Pharm Ind., 123; U. C. Dutt, Malay.	
Medicine — U O Dutt sajs: "Sulphate of Copper has been known in India from a sery remote period. It is prepared by rosting copper pyrites, dissolving the roasted mass in water, and evaporating the solution to obtain crystals of the sulphate. It was known as a sail of copper, for the Bhd-quiprakdus sajs it contains some conner and therefore prepared the properties of that metal. It is	2368
emetic, caustic, and useful in eye	2369
It is purified for internal use, by b exposed to heat in a crueible. It is then soaked for three days in when and dried. Sulphate of copper thus prepared is said not to produce vorming when taken internally. Dose, one to two grains. The Pharma copens of India says: "Hindup practitioners place much reliance on some of their rudely prepared salts of copper, which, for the most part, are and junce or The Sulphate.	
nality It mas	, 23/4
be further purified, it required, by dissolving in water, filtering and eva- porating to crystallization."  According to European Medical practice pure sulphate of copper- tionic, astringent, emeric: in large doses an irritant poison. Locally ap-	2371
phed in substance to a denuded or granulating surface, mildly caustic styptic, and in solution stimulant. The article so used is imported from Europe. It is largely used in chronic dysentery, diarrhoca, epilepsy chorea, and hysteria. Locally, it is applied in solution in gonorrhoca leucorrhoca, purulent ophthalmia, weak ulcers, superficial hemorrhage.	2372

.r.» Wot. Ind., I., 212; harm. Ind. Mat. Med. num. Ceylon '76; Rheede,

030	Decianary of the Economie								
CURCULIO Orchioldes									
MEDICINE.	and, in substance, to cancrum oris, aphthous ulcerations, exuberant granulations, and granular conjunctivitis. (Pharm. Ind.) Waring recommends an emetic of 5 Optium, Onturn, Nux Vomi or other poisoning cases.  Topium, Onturn, Nux Vomi or other poisoning cases.								
	is a both internally and ever- nally The naily be pure copper; calci s and is thus used as tonic, expectorant, and depressent with a second is thus used as tonic, as, &c. "Surgeon Major Robb, Ahmedabad]. "Sulphate of copper is used internally as astringent in chronic discentery and diarrhorn in dose of \$\frac{1}{2}\$ to \$\frac{1}{2}\$ grain, also applied extern". "Autt. Surgeon Nelad Sing. Salarunpore) "Copper coins. two i of. bc cole,"								
Fiates. 2373	porsoning "(Cerei Surge)"  "Copper ful (Sudatir, Swahili, E. Africa) cut into sman principle in the full (Sudatir, Swahili, E. Africa) cut into sman principle in the native (""" which are spread over the chest before and behind is the native (""" and are also that came principle of a series of up for other principle of a series of small blutters."  """ Surgeon Major Tolin								
Leaf, 2374	Robb, M. D., Survat, Bomony J. 1 Correst Le external applic percha tissue of a bandage.  CURCULIGO, Geertn.; Gen. Pl., 111., 717.								
	Curculigo orchioides, Garta.; Baker, Linn. Soc. Jeur., XVII.,								
2375	Most as siyali tuberosa, mining Curculigo orchioides, serial tuberosa, mining Curculigo orchioides, the tuber is genera								
	d, mūshatī 1 11. 1. Iushatī, talamālika (marahi nelepanny kataug, That, t tād, Thi, Nefa tāti gadāe, 11.								

Siyah Musli.

CHRCULIGO orchioides.

a tuberous root some as and the other the sufait

on I'm! Somme and

MEDICINE. Black root. White root. 2377 Substitutes. 2378

white Asparagus adscendens roots of Bombax malabaricum con.

store the black and white forms are obtained from one and the same

sometimes sold by the native druggists of Lakutta underline natio of These articles have, however, separate names and are not

C. ensitona as the care music. 116 fulther state, that moon or inc maior root sold in the Bombay Presidency is Aneilema scapiflorum, Wight (Conf A. 1122), Dr. Dutt says of C. orchioldes: "The tuberous roots of this plant are considered .

debility, and impotence." of this plant is considered .

Trerandrum).

the taste, and is supposed to possess virtues nearly similar to the last-mentioned article. It is prescribed in electuary, in the quantity of a tea-spoonful twice daily; it is also considered as possessing tonic qualities, and sometimes given with milk and sugar, in doses of two drachms in the twenty-four hours, in cases requiring such medicines" Dr. Dymock diarrhoea, colic, and ic, tonic, and aphrond bitters." Native

are collected should id freed from rootlets. cut in slices by a wooden kmie and dried in the shade. Dose 180 prains

Special Opinions.- "The tuber is regarded as a cooling medicine, Is useful in the phosphatic diathesis, and in scleroderma. It is said to possess pon erful aphrodisiae properties. It is largely used in medicines by native practitioners." (Surgeon Major F. M. Houston, Durbar PhysiTRADE. 2380

2379

cian, Travincore, and Civil Apothecary John Games, Medical Store-keeper,

CURCUMA angustifolia.

Wild Arrowroot.

Solar heat to

Use of Caustle

Soda.

improvement; it contained a number of extraneous matters, black particles, straw, &c., all of which residence of extraneous matters, black particles, drying. The other two ples, when soaked in cold acidity; they also exhibit.

from the insoluble to the soluble form. I may add that the Farm sample also gave the same reaction, but to a less extent. Any unnecessary exposure to the solar heat should be avoided. If the samples could be ground

immedrate conversion into mucilage. I ton of caustic soda about 200 grains ( water for steeping the pulped roots, in neu of plain water, this has been found useful in disintegrating and dissolving the nitrogenous matter Thorough washing in pure spring water will remove all traces of the soda?"

to a fine powder it would add to their -----

Cochin, 2392 Travancore, 2393 Substitute, 2304 MEDICINE, Arrowroot, 2395 F000,

Arrowroot, 2306

Benares.

2397

The arrowroot is said to be largely manufactured at Cochin, Travancore, and Kanara. Royle says that "a very excellent kind called *fickar* is also made at Patna and Baglipore from the tubers of Batatus (Ipomæa) edulis"

Medicine.—The arrowroot is used medicinally in some parts of the country.

Food.—A good quality of arrowroot is prepared from the tubers espe cially in Travancore, where the plant grows in abundance. Roxburgh observes that a sort of starch or arrowroot-like fecula is prepared, which is sold in the markets of Benares, and is eaten by the natives. The flour, when boiled in milk, forms an excellent diet for patients or children. It is largely used for cakes, puddings, &c, though include much and always and always and always.

Thicken milk 2398 "a favourse The milk men in Bombay use it to thicken milk which has been watered." The edible properties of the tubers of this plant are alluded to in most of the Settlement Reports of the districts comprising the Central Provinces. Of Seoni it is said they are pounded and made into grue!

PREPARA-TION OF ARROWROOT Travancore. 2309

PREMARTION OF THE ARROWROOT — Drury thus describes the process as practised in Travancore: "The tubers are first scraped on a rough
stick, generally part of the stem of the common rattan, or any plant with
rough prickles to serve the same purpose. Thus pulverised, the flour is
thrown into a chatty of water, where it is kept for about two hours, all
impurities being carefully removed from the surface. It is then taken out
and again put into fresh water, and so on for the space of four or five days.
The flour is ascertained to have lost its bitter taste when a yellowish tinge
is communicated to the water, the whole being stirred up, again strained
through a piece of coarse cloth, and put in the sun todry.

It is then ready
for use."

a T

prepared 50cg) is thus root made from the bulbs of the Curcuma angustifoia, which grows abundantly in the district. It is collected by the Gotés and Kois, and rubbed down on a stone, washed, and allowed to settle. It is then dired, and either sold or bartered by them to traders. The tankir purchased in the buars is impure and difficult to refine, as the bulb is not pared before it is grated down. If care be taken, the flour can be made as pure as that prepared from garden arrowroot. It is strange that this root is not made so much use of as it might be, either as an article of food, or even as starch

### Wild Turment

CURCUMA aromatica.

for export." (For further particulars see the paragraph on Cultiva-PREPARAtion ) TION OF Central e rozincesi. TRADE IN EAST INDIAN ARROWROOT - Drury says the exports of TRADE.

2403

Malabar. 2404

dinacea.

Dymock remarks the young tubers at forms one of the Eas tubers that yield only " colouring matter and later period of growth." Turmeric. 2405 Starch. 2406

Curcuma aromatica, Salisb; Roxb, Fl. Ind, Ed CB.C., 8.

WILD TURMERIC; YELLOW ZEDOARY, COCHIN TURMERIC.

Syn.-Curcuma Zedoaria. Roxb.

Vetu.—Jangli haldi, ban-haldi, ban haridra (jedwar?), Hind , Ban halid, Beeg , hapur kachali, Guz , Ran hald, ambe haldi, Bomb , hastus-manyl, Tan Kastus-pasuba, kattu-mannal, Tet , Anakara kattu-mannar, Mat , Yanaharidra, Sans ; Judwar (according to Roxburgh), ARAB , Kasturi-arishina, KAN , Duda kaha, mal kaha, Sing , Aiyasanoin, BURM

References—Vogt, Hort Sub Cal ,593; Dala & Gibs , Bomb Fl , 274, Annile, Mal Ind. 1 , 490, 49 175, U. C Dutt, Mal Med J- Ind. , 769, 1ear Book Pharm regarding Pharm Ind. , 249,

clop , 859

Habitat -Roxburgh says of his Curcuma Zedoana: "This beautiful species is a native, not only of Bengal (and common in gardens about Calcutta), but is also a native of China, and various other parts of Asia and the Asiatic islands Flowering time, the hot season, the leaves appear about the same period or rather after, for it is not uncommon to find the beautiful, large, rosy, tufted spikes rising from the naked earth before a single leaf is to be seen " "The plant when in flower is highly ornamental, few surpassing it in beauty, at the same time it possesses a considerable degree of delicate aromatic fragrance."

The flowering spikes are quite distinct from the leaf-bearing stems, and the upper bracts of each are more brightly coloured than the lower, and are sterile. Dalzell and Gibson (Fl Bomb) say that it is met with in the Concans flowering in May when the leaves begin to appear Dr. Dymock remarks: "The plant which produces this drug grows wild in the Concan under cultivation it produces central tubers as large as a small turnip. I have had it under cultivation for some years, and observe that the leaves when young have a central purple stam which Bengal 2407

Malabar.

2408

Concan. 2400

## CURCUMA aromatica.

### Wild Turmeric.

Mysore 2410 Travancore. 2411 HISTORY. 2412 almost disappears when they attain their full size." Drury remarks that it is abundant in the Trayancore forests. Of Mysore Mr. D. E. Hutchins says C. aromatica, the Kad arasina, is collected from the forests all over the province.

History of Jadvar and Zedoary.—The reader is referred to Aconium heterophyllum, (A on & 408), for further prriculars regarding the use of the Arabic word Yadvar. According to certain writers (including Roxburgh) this is applied to a species of Curcuma, presumably the present species. To Dr. Moodeen Sheriff we are indebted for the results of much careful study on this subject, the final conclusion arrived at being that the Arabic Yadvar is a name which should be restricted to the roots of the non-poisonous Aconites. The confusion which exists on this subject Moodeen Sheriff attributes to the resemblance of the word Yadvar of Zadvar to Zedoary. Dar-hald and anbh-hald, he adds, are in some Persian works also used as synonymous, but the former is more correctly the name for the medicinal wood obtained from a species of Berberis.

enna (Lib. II., esent time the cock then refers he states that to that plant, ... Royle was the r has failed to D. denudatum rm of Larkspur

is one of the commonest of herbs, but it beats the name or Alinda not Nirbiti, and does not appear to be ever collected for medicinal or other purposes. Some short time ago the writer suggested to Dr. Gimlette, Residency Surgeon, Nepal, the desirability of making a collection of the Nepal tracked as the result, the pleasure

2413

ilings of the Bhotias, who e roots) is a very posonous form of Aconitum ferox, so posonous indeed that the Katmandu drug-

sellers will not admit they possess any. Pahlo (yellow) hikh is a less poisonous form of the same plant, known to the Bhotaas a Holingi, while poisonous by the Wirbsi sen of the Bhotaas) is A. Napellus, and Schlo (white) hikh (the Nirbsi sen of the Bhotas) is A. Napellus, and his week the head of the sentence of the Bhotas).

2414

2415

ever

2416

that Delphinium denadatum is the Nirbist of the earner witters. And urges that the "Nirbishie," made known by Dr. F. Hamilton as found in

Wild Turmeric.

CURCUMA aromatica.

Nepal, "must not be confounded with the word Nirbirs, which is the Sanskrif or Curcuma Zedoaria," To the hill tribes around Simla and Kulu, at least, it is neither Jadwir nor Nirbirs, and, indeed, the roots of that plant bear but little resemblance to those of an aconite and none whatever to the thromes of a Curcuma. But at the same time Dr. Dymock's historic sketch of Jadwar and Zedoaria is valuable, as there seems little doubt but that many of the early authors made the mistake of vewing these names as

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writers
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(Conar also

Confer

J, it would appear to be the
by Fluckieer and Hanbury

rhizome oblong or conical,

often more than two inches in diameter, external surface dark-grey, marked with circular rings and giving off many thick rootlets; at the ends of some of them are orange-yellow tubers about the size and shape of an almost

DESCRIP-TION. 2417

palmate "

Dye-li is probable that this, like the Zedarty, was formerly used in the preparation of the Abr powder. Dymock says: "Like turnere its principal use is as a dyeing agent." Mr. Llotard (Memo Dyring) says it is ractel, used as a dye, it gives a dirty, yellow colour with the alkthine earth chaulis. Afrashe remarks: "The Native women prize it alkthine earth chaulis. Afrashe remarks: "The Native women prize it much from the circumstance that they can give with it, used externally, a priticular lively intege to their maturally dark complexions, and a delicious frigrance to the revolucions."

2410 MEDICINE Rhizomes. 2420

DYE

2118

Mediane.—The nutrowrs are used medicinally, being regarded as tonce and carminative Themstes says this drug is used by the Singhalese. It holds an important place in native perfumery. Dymock states that "the properties of this drug are very similar to those of turnene, but its abovut being strongly camphoraceous is not so agreeable. It is used medicinally in combination with other drugs as an external application to bruses, sprains, &c. In the Concan it is applied to promote the eruption in exanthemateous fevers; it is seldom used alone, but is combined with astingents when applied to bruses, and with butters and acordatics to promote cruptions. Afraise says the Muhammadans suppose it to be a valuable medicine in certain cases of sanke-bites, administred in small doses, and in conjunction with golden-coloured original, kinf (Costiss attablicas) and in conjunction with golden-coloured original, kinf

Special Op mone - 4 "Lised reversal", in scabes and the eruption of small port "(Surgene Merer Heary David Co.), Calinst, Malatan), "Righted into a paste with bearon is a common domestic application to the furthead lee headathe" (Surgene Merer Tehn North, I. M. S., Bargal et al., "Apple do the furthead in ceptual ga, and a context."

CURCUMA aromatica.

Wild Turmeric.

Mysore 2410 Travancore. 2411 HISTORY. 2412

almost disappears when they attain their full size," Drury remarks that it is abundant in the Travancore forests. Of Mysore Mr. D. E Hutchins says C aromatica, the Kad arasina, 15 collected from the forests all over the province

History of Jadvar and Zedoary .- The reader is referred to Aconitum heterophyllum, (A 401 & 408), for further particulars regarding the use of the Arabic word Jadzar. According to certain writers (including Roxburgh) this is applied to a species of Curcuma, presumably the present species. To Dr. Moodeen Sheriff we are indebted for the results of much careful study on this subject, the final conclusion arrived at being that the Arabic Jadvár is a name which should be restricted to the roots of the non-poisonous Aconites. The confusion which exists on this subject Moodeen Sheriff attributes to the resemblance of the word Fadvar or Zudvár to Zedoary. Dar-hald and anbi-haldi, he adds, are in some Persian works also used as synonymous, but the former is more correctly the name for the medicinal wood obtained from a species of Berbens, Dr. D, mark (2nd FJ. Ment Met W. Ind , 769) writes: s, and there appears

. Avicenna (Lib II., he present time the 1: . Dymock then refers vhere he states that given to that plant, Dr. Royle was the

writer has failed to . ive to D. denudatum . 1at form of Larkspur

is one of the commonest of herbs, but it bears the name of Munila not Nir-

2413

to receive a most instructive set of specimens

The Kala bikh of the Nepalese (the Dulingi of the Bhotias, who make a trade in collecting and selling these roots) is a very poisonous form of Aconitum ferox, so poisonous indeed that the Katmandu drugsellers will not admit they possess any. Pahlo (yellow) bikh is a less -- - form of the same plant, known to the Bhotias as Holings, while sen of the Bhotias) is A. Napellus, and

The for similar purposes are thus lob root of which is boiled in oil, thus form

2414 2415 Delnhinum de.. .. the Bhotias, Dr. Gimlette says, is used by e purposes as the Setho and Pahlo bish ianum) is the Ratho (red) bikh of the

Nepalese, and the Nerbisi Num of the Bhomas, and like the Setho bikh is

Lastly, a plant never

aragana crassicaulis, is kurti of the Bhotias , it

The Nepalese name affords a root which is employed as a febrifuge

2416

that Delphinum denudatum is the Narbiss of the earner winers urges that the "Nirbishie," made known by Dr. F. Hamilton as found in Wild Turmenc

CHECHMA aromatica

Nepal. "must not be confounded with the word Nirbisi, which is the Sanskrit for Currima Zedoana." To the bill tribes around Simla and Kulu, at least, it is neither Fadwar nor Nirbisi, and, indeed, the roots of that plant hear but little resemblance to those of an aconite and none whatever to the rhizomes of a Curcuma. But at the same time Dr. Dymock's historic sketch of Jadwar and Zedoaria is valuable, as there seems little doubt but that many of the early authors made the mistake of viewing these names as 

wrongly referred by most writers to Curcuma Zedoaria of Roscoe (Confer. Gusbourt His., Nat , 6me Ed., tom. II , p. 214) It would appear also That it is identical with the Cassumusar described by Pareira. (Confer Pareira Mat. Med. Vol. 11, Pt. 1., 236) Lastly, it would appear to be the same as the "Cochin Turmeric" noticed by Flückiger and Hanbury

(Pharmacographia p 580)" (Dymock, 770)
Description of the Rhizomes.—"Central rhizome oblong or conical. often more than two inches in diameter, external surface dark-grev, marked with circular rings and giving off many thick rootlets, at the ends of some of them are orange-vellow tubers about the size and shape of an almond in its shell. lateral rhizomes about as thick as the finger with a few fleshy rootlets. Internally both central and lateral rhizomes are of a deep grange colour like turmeric, the odour of the flesh root is strongly camphoraceous." Dalzell and Gibson say: "The tubers of the root are

palmate "

Dye-, It is probable that the 11 a the Zadosm the preparation of the its principal use is as a dve avs the it is rarely used as a alkaline earth chaulu.

e it much from the circumstance that they can give with it, used externally, a particular lively tinge to their naturally dark complexions, and a delicious fragrance to their whole frame"

Medicine.—The RHIZONES are used medicinally, being regarded as tonic and carminative Thwaites says this drug is used by the Singhalese. It holds an important place in native perfumery. Dymock states that "the properties of this drug are very similar to those of turmenc, but its flavour being strongly camphoraceous is not so agreeable. It is used medicinally in combination

to bruises, sprains, &c. tion in exanthemateous I

with astringents when ar, Ainslie says the Muhammadans suppose it to be a valuable medicine in certain cases of snake-bites, administerril lit small doses, and in conjunction with golden-coloured orpiment, kind (Costus arabicus), and arkan"

- crabies and the erugilon of ok, Calicut, Malat 191, domestic and the attent to John North, I. M. S. lalgia, and a commette.

DESCRIP-TION. 2417

DVE 2418

Cosmetic. 2410 MEDICINE Rhizomes.

2420

CURCUMA									
caulina.	Black Zedoary.								
Trade. 2421	(T. Ruthnam Moodelliar, Native Surgeon, Chingleput, Madras Presidency.)  Trade.—"The Bombay market is supplied from the Malabar coast. Value, unpeeled R24 to R25 per candy of 5\(\frac{1}{2}\) cwt.; peeled R27 per candy (Dymock).								
2422	Curcuma eæsia, Roxb.; Fl. Ind., Ed. C.B.C., 9. BLACK ZEDOARY.								
	s								
	e WPE's storent sternetsomerked energie								
Bengal. 2423 Dinapore. 2424									
MEDICINE Rhizomes, 2425	temedy in the fresh state much as turmenc is in this ball to influent.  Mediciae.— C								
Cosmetic. 2426	imported into Liverpool under have nearly the same medi-								
TRADE. 2427	horny. The I form Guibourt appears to have with the turmeric of com- used externally as an appli- cation to bruises, for rheumatic pains, and in Consussors.								
2428	C. caulina, Graham; Dalz. and Gibs., Bomb. Fl., 275. Verm.—Ckarara, chowar, Boun.								
FOOD. Rhizomes, 2429 Arrowroot. 2130	Food.—A form of ARROWROUL is said to our processing of the last being it is described by Sir George Birdwood and other writers, the last being Mr. Lisboa, who writers? Corrowance caution grows at Mahafulaeshyar Mr. Lisboa, who writers? Continues tacket-of-leave men used to have been applied to the many years the Chinese tacket-of-leave men used to the value, \$ to 6 pounds to the rupee. Uuting the average of the careful of the suffering poor, but they never used it except in extreme searcity.  C. 2430								

### The Tikor: Turmeric.

CURCUMA longa.

"The preparation of Arrowroot at Mahábaleshvar is simple. The root (of which a cool) will gather 4 or 5 large basketsful a day for as many annas) is scraped, washed, and rubbed to pulp on a grater, as mortars are found to crush the globules. The pulp must then be washed no less than a dozen times at least, the sediment being stirred at each washing. The dark scum on the sediment and the muddiness of the water of the first washing slowly disappear, till when the sediment is pure-white it is allowed to harden into a cake, which is afterwards reduced to powder. A basketful of roots yields 3-4 fb of pure arrowroot,"

Curcuma leucorrhiza, Roxb., Fl. Ind , Ed. C.B.C., 10.

Vern .- Tikor, BENG.

Till .. . . . . . . . . . C --- 1 Pr . --- . -- nacular name for the name Kuva ucorrhiza, it is

onen useu in Maiabar ivi C. Amaua, occause the tubelous root of that plant also yields a kind of arrowroot."

Habitat -- Roxburgh says this is a native of Behar. Mr. J. Glass, the Surgeon of Bhagulpore, furnished Roxburgh with roots of the plant, and soon after it had taken so kindly to the Botanic Gardens that Rox-

burgh wrote "it grows freely and flowers in May"

Food -Mr. Glass wrote as follows to Roxburgh regarding the preparation of arrowroot from this plant, "the process for obtaining the starchy substance called Tikor is as follows; the root is dug up, and rubbed on a stone, or beat in a mortar, and afterwards rubbed in water with the hand, and strained through a cloth, the fecula having subsided, the water is poured off, and the Tiker (fecula) dried for use " Dr Irvine (Mat Med. Patna) alluding to this species says its "fine amylaceous farina is equal to arrowroot."

C. longa, Roxb , Fl. Ind , Ed. C.B.C , 11.

TURMERIC.

2 11 2

Vern — Halds, Hind , Halud, Beng , Haldar, halja, PB ; Haridra, misa, Sans , Kurkum, aurukesafur, sarsud, Arab , Zard chobah, darsard, Pers , Blanjal, Tam , Pasubu, Tel , Mannal, marinalu, Mal ,

Dymock says the best known Arabic names are Uruk-es-subr, uruk es-

316, Dats & Gios . Domo 11 . 0] , Sienari, ro ri , 130 ; Manjella- !

243I

FOOD.

Arrowroot 2432

2433

CURCUMA longa,	Turmenc,
CULTIVATION.	Per as C. ad as W D ''ed, 140; Year Book Pharm, 1813 , Staton, Burma, 513, 563; Man Baden Poall, P. Pr., 203, 300 Drury, U. Pl., 169; Lisbon, U. Pl Drury, U. Pl., 169; Lisbon, U. Pl Liston,
Condiment Form 2434 Dye Form. 2435	Habit for strength and also as a dye, and is one of the most profitable of crops. The dye-yielding rhizome is harder and much richer in colour than the edible. These conditions are thus special adaptations which possibly point to an ancie species of Curcuma are appear to have been mi
	positive character that would justify the supposition that Carcuma longa itself is a native of India Simmonds (Trophead Agriculture, 1983) says. "The Carcuma longa grows wild in the province of Mysote, and is probably indigenous to various other parts." On the other hand, Roxburgh and all botanical writers sp. Ainslie even remarks that "The Carcu China, and is there called Kuong huy list of its medicinal virtues in lepra.    Some office of the which may have in use and which rue arrowroot plant increase. Datzell and secret of the Roman land of the carcumatory of the secret of the Roman land of the carcumatory of the secret of the Roman land of the carcumatory of the secret of the Roman land of the carcumatory of the carcumato
CULTIVATION 2436 Beneral 2437	CULTIVATION, YIELD, AND SOIL.  Solution to shough. This may be sodern system? "The most complete accounts oxburgh. This may be sodern system?" "The sodern system? "The sodern system? "The sodern system? "The sodern system?" "The sodern system? "The sodern system?" "The sodern system? "The sodern system?" "The sodern system? "The sodern system?" "The sodern system? "The sodern system?"
Desht. 2438	in Department of Bengal (Ann. Rep., 1886, p. LV) publishes modern system of turneric culti- tion varieties grown—one known as the Patna variety. The latter is of a nober colour and gives a better outturn. Losmy soil, even of a very inferior quality, will grow turneric. It can be grown in shady  C. 2438

CURCUMA	
longa.	Turmeric.
CULTIVATION	that formal all areas are speciments the for you have the abortion put.
Cost, }	An
Profit.	out
2447	ick,
	· ery
}	• • • • • • • • • • • • • • • • • • •
ł	the nd.
1	
-	roots of turmeric, to the amount of 250th to the acre, are then planted, one to the square foot, and so much water do they require that trenches have
}	to be dug through the whole field only one foot apart. After the rains it has to be watered every week. The roots are ready for digging up in January."
2448	Of Bombay it has been stated—"In Gujarát and Kaira it is planted to- wards the
Yleid. 2440	bigha." parts of Bom- bay "whe ter abundant."
-149	"An average crop will give a return equal to sugarcant, vie., Rtoo per
}	several kinds, the
Lokhandi.	in dyeing is the dicine is " highly
2450	" . ! I also that in concoming curries and dal.
Aromatic.	rown in the Panjab; at
PANJAB.	the Panjáb cultivation.  d requires much care
2452	red till the end of Nov-
}	i frequently along the
- 1	nd nd
1	
}	
2453	
1	
1	consuered quite as form to
2454	that it occupies the soil for six months only. A few localities supply turmeric for the consumption of the whole distinct." The Gazetter
	further states that in the Kangra District there here, in 1000 013 1,000
1	acr 1987-92, 1,520 acres. is alluded to in various publications
MADRAS.	icle has been found that deals with the
2455	bases it is stated that it is usually
1	grown as a mixed crop with yams, maire, castor, brinjal, onions, &c. The soil is thoroughly prepared by repeated ploughing and heavy
)	The soil is thoroughly prepared by repeated ploughing and an arrive manure,
	f at mosel the
}	
į	thenceforward somewhat less unen the history and the first four
ì	dug up. The crop is hoed and weeded several times in the first four months. The other crops are variously planted; the onions on the
,	monetas. The editer trops are throughly positions and

#### Turmeria

CURCUMA longa.

replained that
hat as a rule
s followed by

CULTIVA-TION. MADRAS.

reasures, and the outturn of prepared turmeric, from 3,000 to 5,000b, value to the ry of R120 to R200. To this must be added the value of the other crops, which is very considerable; yams (sie.) (=5e/se halmage or Caladamu nymphaifolium) will yield 250 maunds of 25b each, worth 12 annas per maund. Probably when these two crops are grown together the yield of each is much less. The expense of cultivation, if the labour be charged for as hired, will be something as follows:

2456 Cost.

²⁴⁵⁷.

"When grown on wet land the assessment is usually R6 or 8; as it is watering is watering is n wet lands.

known by various leases; in a recent Karur rent suit the area of the land was 90 cents (say an acre), the crop turmere, the rent paid by the tenant for the use of the Inad for this one crop war R75, and the Government assessment R6. The land-owner who pays the assessment thus cleated R6b by simply letting out this acre of land and the tenant was able to make a profit, after paying this immense rent and the whole costs to limit which we will be suffered to the land was tittle besides manure and seeds; but the value of the crop could not have been much under R150, and was possibly, more."

2458

# PREPARATOIN OF THE RHIZOME.

PREPARA-

Various systems are apparently practised for preparing the rhizome for the market. Of Bengal it has been said:—"After the rhizomes have been dug out of the ground, they are freed from the fibrous roots when the property of

2450 BENGAL 2460

requires to be covered in the night to protect it from des. In some places turmer: is boaled in water in which a little cow-dung is mixed." (Rept. Agn. Dept., p. LV). Of the North-West Provinces, Sir E. O Buck says: "When due up the roots are bo led and dred in the sun; in this form they are the turmeric sold in the Indian bazars. When the die its to be used the roots are again boiled and prodered whe wet A decection is then made of this paste in water, in which the cloth is we'll steeped, being subsequently dired in the shade. In the Kumano d sinct

, W P. 2461 CURCUMA longa,

### Turmeric.

PREPARA-TION. PANJAB. 2462 MADRAS. 2463

the roots are soaked in lime juice and borax before being powdered instead of being boiled." Of the Panjah, Mr. Baden Powell says the tubers are taken up in November and dried partly by the action of fire and partly by exposure to the sun. Of Combatore it is reported. The roots are carefully sized and separately boiled in a mixture of cowdung and water, dried and sent to market."

area 2464

# AREA UNDER TURMERIC.

Trustworthy particulars cannot be learned regarding the total area in India annually under this crop, but from the extensive uses of the tuber and the remunerative nature of the crop, it may be inferred to be very much more extensive than shown in the published returns. The following shows the acreage returned as under this crop. --

n 1												Acres.
Bengal (	acce	ordină	g to L	r. n	/ICG8	inn)	perha	ps	•	•		30,000
Madras	•	•	•	•		•						15,000
Bombay	•	•	٠	•					•			6,000
Barar		•	•	•					•			2 000
Panjáb	•		•	•					•		•	3,500
									To	TAL		56,500

TRADE. 2465

### TRADE IN TURMERIC.

Regarding the Indian Foreign trade in this article Mr C'Oonor, in his Review of the Trade in 1875-77, wrote "Turmenc was exported to the value of 10½ lakhs of rupees, the quantity being 123,824 cwt. This article has hitherto been recorded in the returns under the heading Spices, but it is more appropriately classed as a dyeing material It is not really a spice but rather a condiment, and for this purpose it is very largely used in India, but it is also extens vely employed as a dye, and almost all of that which is exported from this country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distance of the country is used as a distan

ed as Eufoloff.

Foreign. 2466 and as compared with previous years, the article was no longer of importance in 1881-82 the exports were 70,783 cwt, valued at R3,66,047, as compared with 1877-78, when they amounted to R12,40,189 in 1885-86 the trade had so far recovered itself that the exports amounted to 150,887 cwt, valued at close on 14 lakhs of rupees. Last year they amounted to

Internal 2467 140,004 cwt, valued at R10,23,025
Full particulars cannot be learned as to the extent of the internal trade, but it must be very extensive, and even a trans-frontier trade exists, Kashmir receives a considerable amount. The various Indian ports last year exchanged 281,117 cwt of turmeric valued at R24,38,260.

• •

# HISTORY OF TURMERIC

HISTORY 2468

Turmeric yields a yellow dye of a fleeting character, which formerly was far more extensively employed by the natives of India than at the present day. Its chief features that recommended it for decorative purposes at marriage ceremonies, &c, were cheapness, case of preparation, and facility of being removed. But these are conditions even more readily attained by aniline colours, while glaringly brilliant results are obtained, and, consequently, even religious injunctions have

Turmeric.	CURCUMA longa.
to a certain extent given place to the encroachments of the tar dyes Writing of this subject Dr. McOann (in his Dies and Tans of Bengai p. 65), says: "Formerly on festive occasions an infusion of turmers,"	<i>!</i> .
No. 10 Company of the	Wedding Garments. 2469
entire, or the corners, of every new article of dress, whether of man or wo	<b>-</b>
	Cosmetic. 2470

· V. · prepare their yellow terúchúrnum, with which they make the peculiar mark on their foreheads."

Markings on Foreheads. 247I

Sir E. O. Buck, in the Dies of the North-West Provinces, says: "The dye given by turmeric is of a dull yellow colour; it is fleeting, and, Dye Fleeting. except in dyeing the commoner sort of cloth, is seldom used, except in

2472

be rendered permanent as a dye" It is somewhat remarkable that John Huyghen Van Linschoten, who spent several years on the Malabar coast from about the date of 1596, should describe the races of people he met with, going into every detail as to their social habits, domestic and agricultural life, marriage customs, agricultural produce, and industrial productions, but should make no mention of turmeric He describes Car-damoms, Cumin seed, Galanga, Pepper, Cubebs, Tamarind, Ginger, Mangos, &c, &c; but while discussing the preparation of curry and chutney makes no mention of the habit of eating turmeric or of dyeing garments with it. This might be accepted as pointing to its use having been much less general in these days (at least on the Western side of India) than at the present time. On the other hand, an ancient cultivation in India is clearly indicated by the frequent mention of the plant in the early literature of the Hindus, and by the fact that there are several well recognised or distinct cultivated forms of the plant Garcia de Orta, who lived in Goa in 1563 (or shortly before Linschoten), describes under the name Crocus indicus a tuber which appears to be turmeric, and Dioscorides mentions an Indian plant as a kind of Cyprus (Κύπτιρος) as resembling ginger, but having when chewed a yellow colour and buter taste This was most probably turmeric, but it must not be forgotten that several other species of Curcuma afford a yellow colour that indeed it is probable some of the so-called forms of C. longa may prove the tubers of different species

CURCUM.	A Turmeric.
HISTORY.	are known as China, Madras, Bengal, Jara, and Cochin Of these the
Cochin Doubtfully True Tur- meric 2473	I lawleer and Hamoury say or ore
	<b></b>
	country as turmeric, though its starchy tubers are employed to me arrowroot? (Conf with C angustifolia and other sources of East India arrowroot)
DYE	Turmeric Dre.
2474 Dye-Yielding Rhizomes 2475	Dye — It has already been strued that a special form of turmeric is grown for this purpose, namely, a harder root, much richer in the dye principle than in the ordinary condiment form. This dye rhizome receives separate names in the various provinces of India, but is most generally known by the name lok hands halads, other dye forms are as mala-halads, journal-halads, and amba-halds. Under the paragraph, above devoted to an account of the preparation of the tuber, mention has also been made of the further process which the dyer has to adopt in preparing his infusion. The employment of borax, in Kumaon, will be found to have a very considerable interest, since the system there pursued, and doubtless accidentally discovered, is dependent on an important chemical feature of the dye principle. The colour is only deposited in the rhizome with age, and hence, in all probability, the above mentioned forms have been obtained by a process of careful selection of stock observed to produce the colour freely. It
Yellow. 2476	is of importance, however, that the European merchant, in purchasing for dye purposes, should see that he gets the hard dye-yielding form and not the softer aromatic condition which is used as a condiment. Although, of course, turnericis still employed by itself as a simple and cheap dye, its more general use at the present day in India, is as an auxiliary to other dyes and in Calco printing. It is also used to some extent to impart a colour to native-made paper. Mordants are but rarely required with the dye, as it is found to attach itself readily enough to wool, silk, or cotton. Alkales deepen the colour, making a language of the colour and to destroy all about the distribution of the colour and to destroy all about the first properties.
Green. 2477	this process "Here tint, produced always is are sometimes emissioned along with indigo dipped in a solution of halfs of being the analysis of the compound colour in which turneric software along with indigo dipped in a solution of halfs of brighten other colours, as, ristis), lac dye, al (Morinda nd toon (Cedecta Toona).

Turmeric	CURCUM longa.
The Indian Calico-printers use turmeric by preparing a mixture of a gallons of water containing pomegranate rind and alum in the following proportions:—Turmeric Sh. pomegranate rind all, and alum 14b. The compound is left to stand for a night, the surface water strained off, and 14b of indigo added. It is then prepared for use by being thickened with gum, clarified butter, and flour in the usual way. The colour is greensh yellow and is fleeting." (Buck, Dyes and Tant of NW. P., 55.)	EUROPEAN USES. 2479
m when h t i han more any men mend with it it stalle other polo or not	
	Cotton. 2480
	Wool. 2481
colours produced as wool." (Dye- olourng matter of  between and fatty  letton of turmers  is thrown down, by the addition of tin crystals, as a red precipitate; by  acetate of lead, a chestnut brown; by mercury salts, reddish-yellow; salts  of iron colour the tincture brown, alkahes turn it brown; weak acids do  not act upon the pigment, which is turned red by concentrated acids.  The colouring matter of turmeric has received the name of Curcumin.  "M. E. Schlumberger has been the first to investigate the modifying  action of boracic acid upon curcumin. It is well known that turmeric  paper becomes brown under the joint influence of the boracic and any  mineral acid, preferably the hydrochlone. Aimmonia turns this colour  blue. When an alcoholic solution of curcumin is boiled with boracic acid  its colour turns orange, and upon the addition of water to the previously  cooled solution a vermillion-coloured ponder is thrown down, being a	Silk. 2482 Cureumia. 2483
	Action of Boracic Acid Red color. 2484
stance so deposited is first washed with dilute alcohol, next with pure water, in order to eliminate all boracic acid; the residue is dired, and next dissolved in a boling mixture of 2 parts of alcohol and 1 part of acenc acid. This fluid, being filtered while hot, deposits on cooling rosocyanin, while the pseudo-curcumin remains in solution. By pseudo.	Rosocyanin

CURCUMA longa. HISTORY. Of these the European market " Lins Cochin the trade of Cochin, make Doubtfully True Turreferences occur, of turmeric as employed in Europe about the time of which meric Linschoten wrote, so that it must have been exported from other parts of 2473 India or from other tropical countries. Flückiger and Hanbury say of the Cochin Turmeric of the present day that it "is the produce of some other sexclusively of a hubble-based s exclusively of a bulb-shaped arsely or longitudinally into

is horny and of a deep orange-brown, hant yellow Mr. A Forbes Scaly send us (1873) hing rhizones of this t grown at Alwaye, north east of Cochin, and is never used in the country as turmeric, though its starchy tubers are employed for making arrowroot." (Conf with C angustifolia and other sources of East India arrowroot) to the configuration of the sources of east India arrowroot.

brown, the inner substance

other colours, as, dye, al (Morinda edrela Toona).

DYE
22/74
Dye — It has already been stated that a
grown for this purpose, namely, a harder r

Dye—It has already been stated that a special form of turmeric is grown for this purpose, namely, a harder root, much richer in the dye principle than in the ordinary condiment form. This dye rhizome receives separate names in the various provinces of India, but is most generally known by the name lok hands halads, other dye forms are as mala-halds, jouala-halds, and amba-halds. Under the paragraph, above devoted to an account of the preparation of the tuber, mention has also been made of the further process which the dyer has to adopt in preparing his infusion. The employment of borax, in Kumaon, will be

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of careful selection of stock observed to produce the colour freely It is of importance, however, that the European merchant, in purchasing for dye purposes, should see that he gets the hard dye-yielding form and not the softer aromatic condition which is used as a condiment though, of course, turmeric is still employed by itself as a simple and cheap dye, its more general use at the present day in India, is as an auxiliary to other dyes and in Calico printing It is also used to some extent to impart a colour to native-made paper Mordants are but rarely required with the dye, as it is found to attach itself readily enough to wool, silk, or cotton Alkalies deepen the colour, making Alum is said to purify the colour and to destroy all it almost red shades of red The dyers of Calcutta produce a brilliant yellow, known as basants rang, by mixing turmeric with Sajimats (Carbonate of Soda) and lemon or lime juice Dr McCann remarks of this process "Here the acid is apparently used to correct the red tint, produced always where an alkalı acts on turmeric" Myrabolams are sometimes employed with turmeric, but the chief compound colour in which turmeric plays an important part is the green shades formed along with indigo and then denned in a solution of halds

Yellow. 2476

2475

Green. 2477

## Turmeric.

CURCUMA longa.

The Indian Calico-printers use turmeric by preparing a mixture of "4 gallons of water containing pomegranate rind and alum in the following proportions:—Turmeric 5th, pomegranate rind 2th, and alum 11th. The compound is left to stand for a night, the surface water strained off, and 1th of indigo added. It is then prepared for use by being thickened with gum, clarified butter, and flour in the usual way. The colour is greenish yellow and is fleeting." (Buck, Dyes and Tans of N.-W. P., 55.)

The thizome is still largely used by the European dyers, though the fluctuations in the trade may be viewed as due to the development of the andine industry. Professor Hummel says of it :- "Notwithstanding the very fugitive character of the colour it yields, it is still much used, espe-

CALIC PRINTING. 2478

EUROPEAN USES. 2479

Cotton. 2480 Wool.

perature than

flow then be-

into solution. is somewhat With the use of potassium

2481

\$11k. 2482

Curcumin. 2483

of iron colour the tincture brown, alkalies turn it brown; weak acids do not act upon the pigment, which is turned red by concentrated acids. The colouring matter of turmeric has received the name of Curcumin. "M. E. Schlumberger has been the first to investigate the modifying action of boracic acid upon curcumin. It is well known that turmeric paper becomes brown under the joint influence of the boracic and any mineral acid, preferably the hydrochloric. Ammonia turns this colour

dichromate and ferrous sulphate as the mordant, the colours produced are olive and brown. Silk is died in the same manner as wool.

ing of Textile Fabrics, 367.) Crookes says: -" The colouring matter of

turmeric is very sparingly soluble in water, but alcohol, ether, and fatty and essential oils dissolve it readily. The alcoholic solution of turmeric is thrown down, by the addition of tin crystals, as a red precipitate; by acetate of lead, a chestnut brown; by mercury salts, reddish-yellow; salts

brighter, and in the latter case more orange.

masmuch as it does not yield a red colouration with boracic and hydrochloric acids, and on being dissolved in alkalies gives a greenish-grey

to grey. When hydroromo-curcumin, and the on cooling a new body in solution. The sub-

Boracie Acid Red color.

stance so deposited is first washed with dilute alcohol, next with pure water, in order to eliminate all boracic acid, the residue is dried, and next dissolved in a boiling mixture of 2 parts of alcohol and 1 part of acetic acid. This fluid, being filtered while hot, deposits on cooling rosocyanin, while the pseudo-curcumin remains in solution. By pseudo-

Rosocyanin 2485

Action of

CURCUMA Turmeric. longa. **EUROPEAN** curcumin is understood the organic resinoid substance resulting from the USES prolonged action of water upon boro-curcumin, just above-mentioned The rosocy anin is first dried and next treated with other, in order to remove the last traces of yellow colouring matter; thus purified, it is a cry stalline substance, of a cantharides-like justre, insoluble in water, ether, and benzol, but very soluble in alcohol, to which it imparts a most magnificent deep rose-red, quite comparable to fuchim solutions. This fluid becomes permanently yellow on being boiled Ammonia turns the alco-Blue Color. olouration changes 2486 nincal solution red the alcoholic soluthe relations existing between curcumin and rosocyanin (also called Colouration of roscocyanin) and pseudo-curcumin are unknown, neither was, until July, Flowers Cyanin, 1870, the true composition of curcumin known. It is very probable that 2487 the phenomena of colouration as exhibited by curcumin, which turns red and blue, and then yellow again, under the action of comparatively weak re-agents, bear a relation to certain phenomena observed with flowers "It is not impose I la thre there 20- 0- - of | 4 Call tical with the red cc' MM Fremy and ( alkalies. If this suggestion proves correct, on more precise investigation turment could become a useful source of preparation of the red colouring matter of flowers, which it is very difficult to obtain by direct extraction atter, its want of permanence aterial Some time back the Printing Sliks nited to printing and dyeing it is now employed to a vast extent in stuff-dyeing, forming an 2488 important constituent in certain compound colours, especially the so-Sour Browns 2180 called "sour browns" Head or o c MEDICINE. Mad dina 2190 catarrh and purulent opthalmia A paste made of the flowers is used in ringworm and other parasition skin diseases Dymock says the Muhammadans "use turmeric medicianally in the same manner as the Hindus, they also prescribe it in affections of the liver and jaundice on account of its yellow colour" "The editor of the Pharmacopαra of India speaks favourably of the use of a decoction of turmeric in purulent conjunctivitis, he says it is very effecthe fumes of burnmucous discharge. it is "given by the native doctors in the diarrheeas which are so troublesome and difficult to subdue in atomic subjects "Baden Powell remarks that it is employed in "intermittent fevers and dropsy" "It contains much essential oil and powdered is given in eon F Anderson, M B. , powdered halds over burnt charcoal will relieve scorpion sting when the part affected is exposed to the smoke for a few minutes. A paste made of fresh

rhizome is applied on the head in cases of vert go Fresh juice is cooling Fumes of burning root is employed during hysteric fits" (Assistant

MEDICINE.

### CURCUMA Turmeric; Long and Round Zedoary. Zedoaria. Surgeon T. N. Ghore, Meernt) "Turmenc and alum, in the proportion of one totwenty, is blown into the ear in chronic otorrhoea" (I)r. Barasha Here as a Para I He Paris 1 Here actor at annual annual an pa to OF powdered root is used as a lumigation in commencing catarrhs. The inhalation is generally taken at night and no fluid is allowed for some hours afterwards. The effect is and to be in many cases a complete cure of co'd" (Narain Misser, Kethe Bigar Dispensary, Hoshangibid, Central Provinces) "Curcuma longs, the Hungal of Tamil, powdered and mixed with warm milk and pepper n warr, will a necessary to kell erect with fever" (Surgeon-Maje: : water to a su table consisten . . deen-brown colour) forms .

and is used for colouring confections, &c.

l'umes of the burning root --- -er -- 4 -- 1,

prains. Pure turmeric is

This disease is believed to d treated with mantras while "

Chemistry of Turmenc,-Dr. Dymock gives a brief sketch of the chemical history of this subject which should be consulted "Curcumin. the yellow-colouring matter of turmeric, has been examined by several chemists, whose experiments have led to the conclusion that its formula CHEMISTRY. is either Chilliso, or Chilliso, that it melts at 172°, forms red-brown

٠.

249I 2403

## Curcuma pseudo-montana, Graham

Vern .- Sinderwans, sinderbur, sindelwan, hellounda, Bomp

Habitat -Said to be a native of the Konkan, springing up at the beginning of the rains.

Food .- "The tubers, which are perfectly white inside, are boiled and eaten by the people during seasons of scarcity. Perhaps this plant, too, yields a part of Last India arrowroot, that which comes from Rathagiri is manufactured from its tubers" (Lisboa : Dals. and Gibs ).

# C. rubescens, Roxb.

Habitat .- "A native of Bengal, flowering time in the months of April and May, soon after which the leaves appear, and decay about the begin-

ning of the cool season, in November. Every part has a strong but pleasant aromatic smell when bruised, particularly the root." (Rose) Food.—Roxburgh and Volgt say the pendulous tubers of this species yield a form of arrowroot

C. Zedoaria, Roscoe (non-Roxb.); Wight, Ic, t. 2005. THE LONG AND THE ROUND ZEDOARY.

Syn .- C ZERUMBET, Roxo

FOOD. Condiment. Curry Powder.

- 2494

FOOD, Rhizomes. 2495 Arrowroot 2406 2497

FOOD, rrowroot. 2498

CURCUMA Zedoaria

## Long and Round Zedoary

After of E. Bot, 62

Habitat — Roxburgh says it is a native of Chittagong, from which place

1 s extensively cultivated in many parts
g to Ainsile, it is "a native of the East
"In the Kangra Gazetteer [1, p 159].
"In the Kangra Gazetteer [1, p 159].

ABIR 2500 Abir - The red powder, Abir, used by the Hindus at the Holi festival,

Bengal, for the preparation of the Abr power, but a upper coversed the scientific names of the species of Curcuma. The Shati has, for the past forty years, been regarded as C. Zedoana, Roscoe, while Dr. McCann gives it as C. Zetumbet, Isin, —a name which does not exist in botanical literature. If he means C. Zetumbet, Rose, not Linn (a synonym for C. Zedoana, Roscoe) it is unfortunate he did not publish his economic information under the modern name, since the name

250r

be made together and ever, this is not the case n wood and alum used

er the whole district, but in very small

to colour flour composition In Bengal the root-stocks of C Zeudatid, Rosco, are used and apparently as the entire representative of the Abir powder of Upper and Western India The Zedoary is also an ingredient in Gliss, Abir cloves cardamoms, deodar, Artemisia and Cerasiis The

t) The round

Zedoary 2502

horn, internally, having a pitter at a some fine the long Zedoary, which it also resembles in odour. The odour of both drugs is analogous with that of ginger, but weaker unless the boardered when it developes a powerful aromatic dolur

aromatic odour

description
transverse

MEDICINE Rhizomes, 2503

arminative

important articles of native perfuners.  Trade—Dymock says the Bornlay supply comes from Ces' n, sa's Rooto Rao per candy of 7 csc sa's'cas's its'ed, Rostough an en- shat Bengal gets its supply from Chitagon;	2000 2000
Curcuma Zerumbet, Roscoe (non-Roxb)	2507
The writer is unable to white the economic lacts recorded by certain authors under this name from those given he Cartura Zedosita and be suspects that all refer to one and the same plant, or to Rasburgh's Zingüber Zerumbet.	
CUSCUTA, Zinn , Gen Pl., 11, 891.	,
Cuscuta reflexa, Rorb; FI Br. Ind., IV., 235. Convolvelacre The Dodder	2503
Sym -C Grandificara, Wall, C. Vericona, Seed C	1
Vera Hars	,
\$	į

a chiampe of the plant products con children

Chitis' (Grad Surgeon J. H. Tiernton, B.A., M. R. Horelso)

Note withe univer suspects that some of these private better Calaria.

Linn , see A. 430

,074	Dictionary of the Economic
CYANOTIS tuberosa,	
	noticed. It occupies there more than ten times as large an area as in any other Division. The cultivation of guár also reaches its maximum in the same tract, and is an indication of the care of agricultural stock which one would be glad to see extended to other parts of the provinces. "Guár is sown at the commencement of the rains and is cut in October. Its average produce of dry pulse to the acre may be taken as so maunds." Mr. Baden Powell says of the Panjáb: "Gujarat is the only district in the Panjáb proper which exhibits a sample; the pulse is stated by the part of the panjáb proper. The panjáb proper which exhibits a sample; the pulse is stated by the panjáb proper.
	CYANANTHUS, Wall.; Gen. Pl., II., 557.
2520	[CAMPANULACES.] Cyananthus, sp. (? C lindolins, Wall.); Fl. Br. Ind., III, 434; VernMurra, Ps.
	Habitat —"A plant with pretty blue flowers, growing at 10,000 to 12,000 feet in Chumba"
medicine. 2521	Medicine —"The calvees are caten, being mawkish sweet, and are said to be good for asthma." (Stewart, Ph. Pl.)
	CYANOTIS, Don; Gen Pl, III, 851; Wight, Ic., 1. 2082 & 2089.
2522	Cyanotis axillaris, Ræm. et Schulter; DC., Mono. Phan, III., 244; Clarke's Commelinaceæ, table 35; Commelinaceæ.
	ONE OF THE SPIDER-WORTS.
	Vern.—Nirpulii (Rheede), TAM; Soltraj, bagha-nulla (Ainslie),Hindi Itsaka (Lisboa); Boms.
	many parts of India; dis-
medicine. 2523	ir coast this is viewed as a 25 (1st Ed. Mat. Mad. W. India, 680, omitted from 2nd Ed.) that aithough the plant is not uncommon in the nestern Deccan he has not known it to be used medicinally.  The coast this is viewed as a 25 (1st Ed. Mat. Mat. Mat. W. Mat. Mat. Mat. Mat. Mat. Mat. Mat. Mat
FAMINE FOOD. Seeds.	ascites especially when mixed with a little oil Lishoa says that the sreds of this, as also of Commelian communis, were eagerly sought for during the Bombay famine; they are wholesome and nutritious
2524 2525	C. tuberosa, Ram & Schultes; DC., Monogr., Phan, III., 249
-2-2	Syn.—Tradescantia Tuberosa, Roxd , C, adscendens, Dals. in Hook Tour Bo' 6 343 (1852) ; C Barmentosa, Wight, Ic , 2087.
MEDICINE. Root, 2520 FOOD. Leaves.	Vett Steron chunch (a name given from the resembliance of the roots to the papillie of the goal), Hodo jeveng arab (the vegetable), Switch.

C. 2527

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Seir Fish; Cycas or Sago Plant.	CYCAS Rumphi
CYBIUM, Cuv., Day, Fishes of Ind, 254.	}
Cybium Commersonii, Cuv. & Val. SEIR FISH.	2528
Vetn — Surmoyi, Hind, Vunjurrum (male), konam (female), Tet, Konam, mah-wu-luachi or ah ku-lah, Tau, Chumbum, Mal	)
Habitat.—Seas of India, East coast of Africa, and Malay Archipelago Medicine.—An OIL is prepa	MEDICINE
	2529 I
CYCAS, Linn; Gen Pl, III, 444	2530
The brief notices here given of the species of CYCAS will be found supplemented under Sago. This has been rendered necessary, from its being often difficult to discover to which plant the earlier varieties refer.	
Cycas circinalis, Linn; DC Prod XVI, II, 526, CYCADACEE.  Syn — C SPHERICA, Royb, El Ind Ed C B C, 709, C CIRCINALIS, Linn.  1n Thraites En Ceylon Pl, 294, TODDER PANNA, Rheede, Hort Mal, III, 9	2531
V. Coca circinalis, Linn, fer to Sayo and hawal, Dux, tahme, Sino.,	
Habitat.—A palm-like tree met with on the mountains of the Malabar coast and in Ceylon  Food.—The SEPDS are ground into flour and used as food in times of scarcity. "The PLOUR obtained from the seeds of this species is made into cakes and eaten by the Cinghilese, and is reputed a remedy for some disorders" (Eminmeratio Plantarium Zeylania, 294).	F00D, Seeds, 2532 Flour, 2533
C. pectinata, Griff., as in Kurz, I'or. Fl Burm, 503 Vern.—Thakal, NEPAI	2534
Habitat An evergreen simple-stemmed, pulm-like tree, found in Sikhim, Eastern Bengul, and Burma, often in sal or eng or pine forests (Gamble,	
Food — Yields a course sage, which, with the fruits, is enten by the hill-people in Sikkim (Gamble)	FOOD 58EG. 2535 TIMBER. 2536
C. revoluta, Thunb	2537
Often called the Sago-Palm of Japan and China Habitat.—A Japanese species often cultivated in India, has a short thick stem	
C. Rumphu, Miq , Garible, Man Tirib., 415	2538
Syn -C CIRCINALIS, Roth, Ed C.F.C. 7.00 Vern,-Hara-gudu, Tki., Tolda maram, Maki, M. Malaing, Pitty 2 x 2 C. 2538	

•	
CYDONIA vulgaris.	Cycan; Quince
	in '' stem; abundar' In '' n and Andamar
RESIN, 2530 MEDICINE. 2540 Scries, 2541 Food,	(Kurz)  that it excites suppuration in an incredibly short time Special Opinion — § "I he scales of the cone of the male tree, anodyne does go to 60 grains or more" (Apothecary Thomas Ward, Midanapalle Ciddapah). Food,—The interior of the stem yields a good quality of sagoot
Sago. 2542 Seeds 2543	starch, the nutty seeds are in Ceslon made into flour, but they are also enten by the hill tribes of India.
2544	Cycas siamensis, Mig.; Kurz, Burm For. Fl., II., 503  Habitat.—An exergreen, low, stemless, palm-like tree frequent in the eng and dry forests of the Prome district, Burma
resin. 2545	Resin.—Exudes a peculiar whitish gum, like tragacanth. (Kurz)
2546	CYDONIA, Tourn (Pyrus, Linn); Gen Pl, I., 626. Cydonia vulgaris, Pers; Il. Br. Ind, II, 368; Roshcer. The Ourner.
	Syn Pyrus Cydonia, Linn Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bansulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bansulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bansulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bansulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bam tsinii, bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bamsulu, Veru Bihi (abi, according to Ainshe), Hind , Bamsulu, Veru Bihi (abi, according to Ainshe), H
	Reletences — Brandis, For Fl., 205. Gamble, Man Tumb, 161. Stevart, PP Pl. 80; DC, Origin Cult Pl. 328, Home Days for regarding Parm Ind., 224, duality. Parm Ind., 224, du
	Habitat,—Cult up to 5,500 feet in the woods in the north of Persia, r sus and in Anatolia Naturalization may be supported in Europe No Sanskrit name is known for the guince, neither is there any thebrew name, but its Persian name is Huwak area is the Russian for the cultivated quince, and for the wild plant as to an ancient knowledge of the
oil 2547	DeCandolle adds that it may the cpoch of the Tropan War (Orig Cult Pl, 237) Oll—Baden Powell mentions this of Panjáb Products Docyma indica, ery plentiul in Sikkim, Bhutan, khasia Hills the ground at certain seasons is simply covered with the trut left rotting under the trees. This might easily be put to some economic
MEDICINE Seed 2548	which is found in idan practitioners,
	C 2548

Products of India.	677
Quince.	CYDONIA vulgaris.
	Médicine.
mony eaten as a TRUIT by the Arabs and Persians, and are considered tonic, cephalic, and cardiacil; they are also eaten baked. The LEAVES, BUDS, and LARK of the tree are domestic remedies among the Arabs on account of the East and the Cartington to the Cartington	Fruit. 2549 Bark. 2550 _
	Mucliage 2551
corresponds in composition with that of linseed "  armacographia ) forms a pleasant cases of irrita- Rai, Mootlan)    about one drac    are known here    plaints and se    Almedabad).	
then strained c drink which if sweetened and iced is most isseful in cases of diarrheca for young and old (Surgeon G F. Poynder, A.M.D. Roorhee) Food—When ripe the FRUIT is eaten, it is sweet, slightly juicy and astringent. It is also made into preserve, and, as having a powerful odour, is often used to divour mixemalade and other preserves. Wrine is sometimes made from it. It is supposed by some to have been the Golden Fruit of the Hesperides. It is largely grown in Kangra (especially near Naggar), and the fruit is used in making preserves (Gas. p. 37). It is also cultivated to some extent in the Peshawar Valley and at Lahore. Stewart says it is common in Kashmír, where the fruit is said by Vigne to be very fine. Oayley states that a small quantity is exported from Kashmír into Tibet. Abundant in Afghanistan, whence fruit and	F00D, Fruit. 2552

no other fruit of remarkable goodness ) Attenison in his Auram valvey Flora makes no mention of this plant.

Trade - Dymock says "Quince seeds are imported into Bombay from the Persian Gulf and Afghánistan Value Rio to R25 per Surat maund of 373 fb, according to quality." Moodeen Sheriff points out that Behdanah and Be-danah are so much alike in sound that mistakes are likely The latter is the name for a peculiar seedless raisin but to be made is often loosely applied to all raisins.

Cymbopogon, see Andropogon, GRAMINEE.

C. citratum, DC, see Andropogon citratus, DC, A 1079

C. laniger, Desf , see Andropogon langer, Desf ; A 1093

C. Martini, Roxb., Munro, see Andropogon Schenanthus, Linn; A. 1117

C. 2553

TRADE 2553

CYDONIA vulgaris.	Cycas; Quince.
RESIN, 2530 NEDICINE, 2540 Scales, 2541 FOOD, SABO, 2542 Seeds,	Habitat.—A — branched stem; abundant in the Malabar Tenasserim and Andaman Islands. Often Resin.—Exudes a good sort of Medicine.—Kurz says the r that at e — Spec ( dose 30 Cuddapan).  Food.—The interior of the stem yields a good quality of sago or starch; the nutty seeds are in Ceylon made into flour, but they are also eaten by the hill tribes of India.
2543 2544	Cycas siamensis, Miq.; Kurz, Burm. For. Fl., II., 503.  Habitat. eng and dry
resin. 2545	Resin.—
2546	CYDONIA, Tourn. (PYRUS, Linn.); Gen. Pl., I., 626.  Cydonia vulgaris, Pers.; Fl. Br. Ind., II., 368; Rosace  The Quince.
	Syn.—Pyrus Cydonia, Lina.  Vesn.—Bibi (abi, according to Ainslie), Hind.; Bam tsántá, damsulu, Kasumir, Shimai-madalavirai, Tam.; Bibi fursh, safarjal, Arab. Moddeen Sheriff gives the following names for Quince seeds:— Habbur-safarjal, Arab.; Jihir-dinah, beh-dainah, tuhme-dái, Pers.; Beh-dainah, Hind.; Duk.; Shimai-madalai-virai, Tam.; Shime-dailmba-bija, Simg.; Shime-dailmba-virtiuh, Tet.
	References.—Brandis, For. Fl. 2003.  Ph. Pl., 80; D.C., Origin Cult. Fl. Fl. 10; D.C., Origin Cult. Fl. Fl. 2004.  Ph. 10; D.C., Origin Cult. Fl. Fl. 2004.  Mat. Mat. A.  G. Trum, Mat. Pl. 1., 105; S. 4.  Mat. Mat. Palna, 10, 105, Baden  U. Pl. Bomb., 110; Birdaood, Bon  XI. Quince used in his day was brought from Crete).
	Habitat.—Cultivated in Afghánistan and the North-West Himálaya up to 5,500 feet. DeCandolle says it grows wild in the woods in the north of Persia, near sus and in Anatolia.  Sanskrit name is know name.  but its Persian name.  unated quince, and for the wild plant a:
01L 2547	to an ancient knowledge of the DeOandolle adds that it may the epoch of the Trojan War (Orig Cutt, Pl., 237).  Oil.—Baden Powell mentions this as an oil-yielding plant in his Litt of Panjab Produits. Docynia indica, Dene, a nearly allied plant, is very plentiful in Sikkim, Bhutan, Khasia hills, and Burma. In the Naga Hills the ground at certain seasons is simply covered with the fruit left rotting under the trees. This might easily be put to some economic
medicine. Seed. 2548	

### Dub or Doorwa Grass.

dactylon.

BENG, Dhob-ghás, SANTAL; Duba, kali ghas, rám ghas, N. W. P; Dhupsa, hariali, C. P; Dureá, SANS; Durea, karala, haryeli, MAR, drugam pilla, hariali, TAM, Ghericha, haryali (UPPER GODAVERY), TEL.

As my ty pay the season at all all any per a for named for

References —Rexb, Fl Ind, Ed. C B C, 97; Voigt, Hort Sub Cai, 712; Thrantes, En Ceylon Pl, 391; Dals & Gibs, Bomb Fl, 297; U. C Dult, Mat Med Hind, 272, 297; Dymoch, Mat Med W Ind, 2nd Ed, 854, S Arjust, Bomb Drugs, 153, 327; Fournal Agri Hort Soc Ind. (1885), VII, Pt III, Pro C VI. Report 1314 (1885), Pl, Pt III, Pro C VI. Report 1314 (1885), Pl, Pt III, Pro C VI. Report 1314 (1885), VII, Pt III, Pro, 283, 200, Bredical Top Dacca, 60; Baden Ponell, Pb Pr, 514, 2415; Island, U. Pl Bomb, 208, 776, 772, 283, 200, Bredical Bomb, Pr, 128; Reyle, Ill Him Bot., 421; Ballour, Cyclop, 869, Sn.llb, Diec, 155

Habitat—A perennal 'creeping grass and flowering all the year round, grows everywhere throughout India, except perhaps in the sandy parts of Western Panjab, where it is rare. In winter it appears scanly, at which time it may be said to be a trest. It abounds in the Sunderburns. It is particularly abundant on road sides, delighting apparently in the admixture of sand and gravel which it there gets along with the ordinary soil it is readily propagated by chopping up the shoots and scattering the pieces over the prepared soil, It ascends from the plains to altitudes the state of the prepared soil, it ascends from the plains to altitudes the state of the prepared soil.

Hay 2550 MEDICINE, 2560

Medicine.—In the Athawana Veda it is said "May Durba, which rose from the water of life, which has a hundred roots and a hundred stems, efface a hundred of my sins, and prolong my existence on earth

purposes this grass is often confused with Eragrestis emosuroides. The Inter is the Kath, Darbh or Dab (the Gramma of the Portuguese and the Gramen of the Romans but not the appears; (Tritteum repeas) of the Greeks), it is used extensively at funeral ecremonies of the Hindus, the their moutner wearing a ring of the grass. The latter is sacred to Ganesh Both grasses are indiscriminately used in compound prescriptions with more powerful drugs in the cure of dispetery, menor ranger, &c (Dymock) Sakharam Arjun says —"A white variety, which appears to be only a

256I

This disease may be the same as that which is common in the West Indies, caused by Pulex penetrans."

Specification (Comments of Comments 
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Juice. 2562

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078	Dictionary of the Economic
CYNODON Dactylon	
	Cymbopogon Nardus, Linn, see Andropogon Nardus, Linn, A. 1107
2554	CYNANCHUM, Linn, Gen Pl, 762
	Cynanchum pauciflorum, Br , Fl Br Ind, IV, 23, Wight, Ic,
	Syn — Asclepias tunicata, Roth Fl Jud Ed CB C, 253 Unan Chum rauciflorum, R Br in Dals & Gibs Bomb Fl 1585 Cynoco- torum rauciflorum, Decaise, Thwester, En Ceylon Pl, 195 Vetn — Chagul pate Beng , Kan-kumbula, Sino
rood Leaves 2555	Habitat.—A large twining shrub met with in the Deccan Pennsula, from the Concan southwards to Truvncore and Ceylon This is the region given in the Flora of British India, but according to Roxburgh (Asclepias tunicata), it is found in Bengal also.  Food —The Cinghalese eat the young leaves of this and of many other plants of this natural family, in their curries (Enumeratio Plantarus Zeylania, 195)  This does not appear to be the case in Bengal, Roxburgh simply remarking that its milky juice is particularly gummy
	CYNARA, Linn ; Gen Pl., II, 469.
2556	Cynara Scolymus, Linn, Composite
	Artichore
F000 2557	Vett — Hatt choke, Beng, Hing, Artichoke, kingin, Bonn References — Vorgt, Harf Sub Cal, 255, Stewart, 15 Pt 185, 16C Origin Cult Pt, 02, Friminger, Blan Gard in Ind. 169, Indian Forester, Vitt. 182, and V. Jour deer they Six Ind. 1825, 197, 198, 198 Habitat — Cultivated to a limited extent over most paris of India for the Furopean market Food — The lower parts of the thick imbricated scales of the flower heads are called artichoke bottoms, and being thick and fleshy are exten as a vegetable. Although very generally cultivated the artichoke in India becomes larger and coarser than in I urope. Firminger says it is better known and more generally cultivated in India than in I agland. Any time from the end of July to the beginning of September is suitable for sowing the seed, which usually germinates in about 10 or 12 days. The seedlings should be transplanted when about a hand high and be placed at about 3 feet apart. They thrive best on a rich soil. The artichoke may also be propagated by suckers which should be eparated from the stock in September. In the plans of India it flowers from about the beginning of May, but in the hills a hitle later.
	CYNODON, Pert , Gen Pl , III , 1164
2558	Cynodon Dactylon, Pers. Duthie, Folier Granis N Ind., 521 CREENING PARTE GRASS OF DOORWA, COLCH GRASS
	Sym - C. Stellatin, H., I.; Paracum Dietricov, Lian ; Perfettive Dietricov, Dl. Dietricov, Dr. Soy. Verm - O. S. Sourra, Judica betarn, 1888 in 1888 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 in 1881 i
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CYNOGLOSSUM micranthum.

The Cynoglossum or Dog's-tongue. mic

FODDER, Hay. 2566

Regarding the curing of hay the following remarks with reference to this grass are of value:

"Hariali, like most other meadon grasses, should be cut immediately

of the grass are more made from the fully d appears, the plant is

d appears, the plant is more vigorous and produces another crop much sooner. Haralt hay is

has it is absolutely necessary to keep it moving. At night, if the dews are heavy, it should be put up in small cocks, each containing from two to three and.

t _ derive and the many year and the

of course putting it again into cock at night

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of course putting it again into cock at right
"Hay thus rapidly made is rich in saccharine matters, and is, therefore very liable to heat and ferment, this, to a moderate extent, does

fore very liable to heat and ferment, this, to a moderate extent, does no harm to feet the section of the limit of the lim

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pieces of the stems of palmyra or cocoanut trees, the one resting on the
other so as to form a pipe, will equally effect the purpose, or, in building
two or three layers of dry paddy or cholum straw placed in a strek will
present it heating to am jingurous extent?

"CREENSO PASSIC GRASS—Of Eastern Bergal it has been said;

CYNOGLOSSUM, Linn. Gen Pl. II., 849 ( WORMSHIFF CYTOGOTSTIM micranthum, Deef., Fl Br. Int., IV., 1361 Vern., Nilstein, Pa., Oudhaphall, Go.s., Alhoputhsi, Sans., Ilu ballu,

bende, Sixo.

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# Dib er Doorwa Grate

MEDICINE

art open, and also whom at terminist and one of Section Major 7 M. Master of Substitution, French resear May 1 de to Josephan 1 Mille of the set of the Proposition, Mille of the set of the Section of the set of the Major set of a sample of the set of the Section 1 of the set of Mannay steet of a sample of the set of the Section 1 to the Section Mannay steet of a sample of the set of the section of the set of the section of the set of the section of the set of the section of the set of the section of the set of the section of the set of the section of the section of the set of the section of the sect

700b. 2503 Fobbur 2501 Food and Fodder,—A cov' ng drink is all ovaid ty be made from the roots. It is the mixt common and useful grave in field, and it is stems as well as its roots ingert a large proportion of the fised of our borses and cown. Mr. Duthlo says it was es considerably both in habit and ruttime qualities, according to the satter of the soil or climate. It makes excellent hay and will keep for years. It is by far "the most useful of all fodder graves, repeatable for horses." "It is considered to be a first climate fodder priss in Australia, where it is widely distributed.

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2565

Hantal Grass (Cynodon Daetylon)—The doob grass of Northern Indin—the Couch grass of Australia and America—is a valuable but over-rated fodder plant, possessing great sutility and wide-operating roots, which are capable of propagating the grass from each section of them; it is suited to our long droughts and is also capable, under high cultivation and irrigation, of producing heavy cuttings of tough wity fodder, which, however, must possess considerable nutrinize qualities, on poor soils its liable to be crushed out by inferior types of plants, but on those of fur quality it is very persistent and difficult to eradicate; the latter point is detrimental to its use as a crop to be taken in a rotation. When highly cultured it prefits heavily under irrigation and is grown for hay near some large stations. In 1868 there was a plot of this grass on the

The following system is recommended for putting down this fellow. The lind hiving been well cleaned should receive a dressing of fold-yard manure when ploughing in the manure a worms should follow each plough and drop the roots in the open furrow, the succeeding plough covering them up, when its furrow is similarly plinted, and the process repeated, a heavy harrowing and rolling complete the work."

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CYPERUS.	Cynometra : Cyperus.
DYE. 2570 MEDICINE. 2571	Habitat.—Native in North India and the Himálya, altitude 1,000 to S.000 feet, from Kashmír to Bhutan and Fegu; common.  Several species of closely alked plants belonging to this genus are occasionally mentioned by authors as of economic value. It is doubtful how for their hours are considered to the common for their hours are considered to the common for their hours are considered to the common for their hours are considered to the common for their hours are considered to the common for their hours are considered to the common for their hours are considered to the common for the common for the commo
	CYNOMETRA, Linn.; Gen. Pl., I., 586.
2572	Cynometra cauliflora, Linn.; Fl. Br. Int., 11., 268; Legymyose. Vern.—Iriga, Mal.; Niam-niam, Mylay.
01L 2573	Habitat.—A tree of the Western Peninsula, South India, Ceylon, and Malacca. Oil.—It yields an oil said to be prepared in North Arcot, and used for medicinal purposes.
2574	C. polyandra, Roxb. ; Fl. Br. Ind., II., 268.
OIL. 2575 TIMBER, 2576	Vern,—Pene, Cacillar, SYLHET.  Habitat.—A large evergreen tree of the Khasia Hills, Sylhet, and Cachar.  Oil.—In Spons' Encyclop, it is said that the oil which this plant yields is used medicinally.  Structure of the Wood.—Light-red, hard, close-grained. Mann remarks it is very useful for scantlings, and makes good charcool.  C. ramiflora, Linn.; Fl. Br. Ind., 11., 267.
	Son -C nunca Shanaghe.
bye. 2578 011. 2570 Medicine. 2580	Vern.—Skingr, Bruc. (as in Gamble); Iraph, Tan.; Bymeng, kabens, mpeng-kabin, Buran.; Ga mendira, Skind.  Habitat.—A large, evergreen tree of the Sunderbans, South India, and Burma, in tidal forests; frequent from Chittagong down to Tenasserim and the Analysis of the Company
timber, 2581	Skinner says that d in the Sunderbans
2582	Cynosurus cristatus, I is particularly valuable for to a considerable depth.
2583	CYPERUS, Linn.; Gen. Pl., III., 1043.  The roots of several species are tuberous, such, for example, as C. cotymbosus, C. esculentus, C. stoloniferns, C. rotundes, C. jeminicus, C. scariosus, &c., &c. Several of these are edible, others afford aromatic C. 2583

Mats and Matting ma	YPERUS laccensis.
Cyperus inundatus, Rexi.; Clarke in Lirr. Soc. Jeur., XXI., 73.  VemPat., Hivo and Bers.  Habitat An aquatic species met in the jheels of some parts of Bep-	2601
Medicine.—Irvine (Mat. Med. Patra, $\&z$ ) writers: "The tubers are used as a tonic and stimulating medicine"	MEDICINE,
C. Iria, Linn; C.B. Clarke, Linn. Soc. Jour, XXI., 137.	{
Syn.—C. Parviflorus, Nees in Wight Contrib. 87, nec. Vahl., nec. C. UMBELLATUS, Roxb., C. IRIA, Lunn as in Roxb., Fl. Ind., Ed. C. B. C. 67	2603
Vern.—Bura chucha, Beng.; Wel hirt, Sing	
Habitat.—"A native of most cultivated lands" (Rozé) Frequent in India, having been collected at Almora (1,200 feet), Mussourie, Nepal, Sikkim, Sonada (2,200 feet), Assam, Khasia Hills, Lucknow, Parisnath in Behar, Chutia Nagpur, Central India, Mount Abu, Puna, Mangalore, Ceylon, &c.	
Fibre.—The culms are used in mat-making.	FIBRE, Mats,
C. jeminicus, Rotth., C. B. Clarke, Linn Soc., Jour XXI, 175  Syn.—C. Bulbosus, Vahl., Nees, in Wight, Contrib, 80; Dals and Gibs, 18, Annth, in part musta, Saas., Thegi,  Iry sandy pasture del Coast, Ollarke Ceylon, Abyssinia, and Central Africa	2604 2605
Food "The roots are used as flour in times of scarcity and eaten roasted or boiled" When roasted they have the taste of potatoes, and would be valuable for food but that they are so small "Dr James Anderson, in an excursion to the southern part of the Peninsula of India.	FOOD. Roots. 2606 Flour.

Anderson, in an excursion to the southern part of the Peninsula of India, discovered that the shilandi arisi, growing in sandy situations by the seaside, and requiring but little water, was the common food of the natives during a famine, and sant to the taste, and

of sago" (Balfour) into meal and make other dishes" (Drury )

C. longus, Linn , Clarke, Linn Soc Jour , XXI , 163

Clarke describes five or six forms of this plant, the type of the species occurring on Mount Abu and in Cabul, β pallescens, Poets, in I gypt, Cordofan, &c, γ cyprica in the island of Cyprus, δ badia in southern burope, Madeira, and doubtfully in Madras, ε elongata in I gypt, Africa, &c

C. malaccensis, Lam , Clarke, Linn Soc Jour , XXI , 147 Syn -C MONOPHYLLUS I ahl , C PANGOREI, Roth , Fl Int , FI CR.C. 68 C INCURVATUS, Roxb , 66, C TEGETIFORMIS, Benth ; C. GAN GETICUS, Roxb Vern - Chumati pati, Besa

C. 2609

2607

CYPERUS Haspan	Sedges used for
Fodder 2590	Tinnevelly, and the article is therefore heavier, coarser in texture, and not so flexible."  Fodder—"Cattle are not fond of it, and it is only eaten occasionally by buffaloes." (Roab)
2591	Cyperus elegans, Linn , CB. Clarke, Linn, Soc Jour , XXI , 125
	Syn -C MESTUS, Kunth, C NIGROVIRIDIS, Thw, En Ceylon Pl, 344
	Vern — Wek chan, Burm (Kurs, Pegu Rept)  Habitat — A native of Bengal and the Malry Pininsula, Sikkim 1,500 feet, Assam, Khasia hills 1,200 feet, Sylhet, Yunan, Chittagong, Mergu, Tenasserim, and the Andaman Islands
2592	C. esculentus, Linn, CB Clarke Jour Linn Soc, XXI, 178
	Syn —C Tuperosus, Rottb
MEDICINE Root, 2503 Födu, Root 2594	Vera — Kaserá dila, Pa, Sãa ts'an, CHINESE  Habitat — There we five or six distinct forms of this plant of which two occur in India vis forma tuberosa (sp. Rotth) in Madras and forms hindustanica in Northern India  Médicine and Food — Stewart says "In N - W Provinces the root is used as food, and is official as kaseru. The dila root, mentioned by used as setten in the Peshawar valle, may be the same. Dila, however, appears to be a generic name for the CYPERAGEE the roots of several of
FIBRE 2595 Coffee Sub- stitute 2596	- nused substi-
2597	C. exaltatus, Retz; CB Clarke, Linn Soc Jour, XXI, 186
	STD -C UMBELLATUS I dahi according to Roob, FI Ind., Fil G B C Copf C VENUSTUS R Br., Themates In Cephon Pl., 432 (nec Nees nee Aunth), C ALTUS Nees, in Wight, Contrib, 84 Vett -Feldus habata TEL.
Fiere. 2593 Mais. 2599	Habitat.—Commonly found in Bengal (Chura Nagpur, Raimahal, Rel, and in the Pennsula of Indra generally (Mysore, Madria Central Indra, Mount Abu, Oudh, Rel, and in Ceylon. "A large species, growing in standing fresh water." (Rosb).  Fibre.—This sedge is often used for matting. Mr. O. B. Olarke, describes four forms of the plant, a the type alluded to mainly in the above rotes. Bansan (Sec. Camenus, Rossing from Kunth) and C. alopecuroldes, Rosh). This is met with in Calcuttra and in Madria. "A distribution of Flypt but Mr. Olarke has also found it at Mutha in Bengil; termits." the type specimens of this at Kew agree exactly with my Critical teatures, and the Control of the specimens of this at Kew agree exactly with my Critical example, so that if C. divers a distinct species, it is an Inflam one. The specimens of the specimens of the first mother of the specimens of the specimens of the first mother of the specimens. The specimens of the first mother of the simulation of the specimens of the specimens of the specimens of the specimens of the specimens of the specimens of the specimens. The specimens of the spec
2500	C. Haspan, Ista , Cart , Ista Sc four , XXI., 119
,	Syn. C un lar s, but, lette Pedlandia of the Telegrat
	C. 2600

### CYPERIIS Mate and Matting. dysenters in doses of about a scruple (Med Top of Dacra by J. Taylor, "In the Concan the fresh tubers are applied to the breast in the form of lep (malagma) as a galactagogue C. rotundus is the κύπερος of the Greeks, and is mentioned by Dioscorides, who says it is the Juncus or Radix Tunes of the Romans, and is us 1 gue, and applied to scorpion stings, and it is also an ingredient of varm plastere as an aromatic plant, used by the Scythians for embalming Κύπειρον is mentioned in the Iliad (21, 351), and Odyssey (4, 603), and by Theophrastus in his fourth book, it appears to have been a favourite food of horses Pliny (21, 18) calls it Juncas triangularis or angulosus, it is probably the Juncus of Celsus (3, 21) mentioned as an ingredient in a

ust soil are C : preferred. They are extensively used as an aromatic adjunct to numerous compound medicines

diuretic medicine for dropsy, although he calls it Juneus quadratus" (Dymock, p. 844) Arabian and Persian writers describe the drug as

Special Opinions - § " Roots are aromatic and commonly used in indigestion of children combined with other aromatics with benefit" (Assistant Surgeon Shib Chunder Bhattacharje, In Civil Medical Charge, Chanda, Central Provinces) "Roots are used as an astringent in the diarrhoea and dy ertery of children" (Bolly Chand Sen, Teacher of Medi "The roots are in Chutia Nagpur used in fever" (hev A "The fresh roots are stimulant and diaphoretic" (Bombay Campbell)

Gazette, VI , p 14) Fodder.-Cattle eat this so-called grass, and hogs are remarkably fond of the roots.

Cyperus scariosus, R Br , C B C., Linn Soc. Jour , XXI , 150

Syn,-Cyperis Pertentis, Pozb , Fl Ind , Ld CB C .// Vett.—Asgar-mothé, Hind, Népar-métha, Byno; Iawdia Man; Soade kéf, 200d, Anne, Mishike samin, Pyn; Nójar-mutiké, Sans, hogar modah, Dec, Bhithahdéh, kérdi kishanu, Hay Tunga gaddala-eru, kélatunga mute tit; Kéra kishanna, Mal.; Konnort-gadde, Kan, Vomon niu, But.

References - Pont, Fl. Ind., Fd. C.B.C., W.; Med. Top. Afmir. 147;
Dymock Mat. Med. W. Ind. 2nd. Fd. 815; Ironne. Mat. Med. Latina, 75: Birdwood, Lomb Ir . 941 Ls tard, Dies, Supp . IV

Hab.tat. - A del cate, slender grass, met with in damp places in Bengal. Oudh, and rare in the Panjab, by no means so common a plant as C rotundus

This is apparerally the Koray kalung, Tam, the Nagar motha, Dux. and Mura, Saxs, described by Ainsho (Mat , Ind 11 , 162) under the name of Cyperus jancafolius, Pottler

Dye - The thizoners are used in dyein, to give a scent to the fabric, and as a perfume for the hair. Rorburgh describes them as "tuberous with many dark-or orred silvan flores" "Its naked delicate form, small and compound untiel, at at the fer leaves, and scanty involucre imme 17. dia ety de in, a etin' fri-it

Medicine. The Print and de-ccant, and : :: phoret c and d urete. " 1"- scariosus.

MEDICINE.

PODDER. 2616

2617

DYE 2618

MEDICINE. I oot. **2**010

te that it is doses as an ingredient

CYPERUS	
rotundus	
	Habitat.—Roxburgh says of his C Pangorei that it is a native "of the banks of the Ganges, and series, with C inundatus, the same useful purpose, though in an inferior degree." Of his C incurvatus remarks that it also is a native of the banks of the Ganges "flowering during the cold season." Olarke adds that it occurs at Noakhai, Calcutta, the Sunderbuns, Dacca, and is distributed to Artacan, Pegu, Singapore, Japan, and China.
2610	Cyperus niveus, Retz.; C.B. Clarke, Linn Soc. Jour , XXI., 108
	Vern — Birmutha, SANTAL  Habitat. — Throughout India Panjab, Kumnon, Simin, Kulu, Nagpur, Rajmuthat, &c.), Madras, &c., &c. A.  ture land (Rosb)
i	C. pertenuis, Rold, see C scariosus, R. Br.
5611	C. Pongarei, Rotth, as in Roxburgh, see C. malaccensus; and for other plants named by different authors as Cyperus Pangorei, see Cyperus corymbosus.
2612	C. rotundus, Linn; C B Clarke, Linn. Soc Jour, XXI., 167
	Syn.—C. Herastachuog, Roeb  Veto—Mithdy, moths, Berd, Batho-byir, Mundart, Utru benda, Unnov, Tendi into Santal, Musid, gunden bhadra music, mutadi, Sant, Afron, Tan, Sabaha tungas-etin, bhadramite, tongo music, musidamin, kawariaka music, gandala, Tet, Musia, bariandh, Bomb 3 kofe ki jhár, Dec., Bimbal, Mar, Motha, Guz, kalan iru, Sino  References—Roeb, Fl. Ind., Ed. C. B. C., 6d., Jone As. Soc., Pl. II (1867), P. 27, Home Dept. Oficial Corres regarding Pharm Ind., 23', Howe's Tour in Bomday, ph. 112, 120, &c., 6c., Moder Elliot, Flora Andhrica ph. 25, 76, 184, 120 &c., Moodeen Sherif, Siph. Pharm Ind. 23', D. C. Dutt, Mar Med. Lind, 214, Dynoch Mat. Mich. W. Ind., 2nd Ed., Ray, S. Arian, Bomb. Dr. 18, 150, Enden Powel, Pb. P., 302, Altinston, Him. Dut., 734, 669, Eutracowe, Lomb Pr., 94
DYE 2613 011. 2614	Habitat — A plentiful species in India occurring from Kuram Valley, Afghánistin, Gligti, and Kashimi to Smirl, Garthwal, and the Alinsia hills throughout the pluns (Lahore, Bengal, Madras), and ascending the mountains of the central table-land (from Mount Abu and Poona to the Nighrit hills) Dr. Hove, who travelled in 1787, speaks of the plunt as very abundant in Bombay  Dye—Used in certain dye preparations to impart a perfume to the fabric.  Oil—The rounded rhizomes are said to yield an essential oil, which the natives of Upper India use to perfume their clothes. In Bengal the tubers of this spaces are good laceful used in perfumery than are those of
MEDICINE.	C scariosus, being more plentiful—in fact it is a troublesome were house used "as perfume at the a diaphoretic and astrin-
Roots, 2015	gent Sumulant and diureise properties are also attributed to them They are further described as vermitige. In native practice, they are held in great esteem as a cure for disorders of the stomach and irritation of the bowles. The bulbous roots are scraped rud pounded with green ginger, and in this form mixed with honey they are given in cases of

C, 2615

## Mats and Matting.

CVPERIIS SCATIOSUS

dysentery in closes of about a scruple (Med. Top. of Dacra by J. Taylor, "In the Concan the fresh tubers are applied to the breast in the form of lep (malagma) as a galactagogue C. rotundus is the κύπερος of the Grait and amen and h Presentate, who says it is the Tuncus

is mentioned in the Iliad (21, 351), and Odyssey (4, 603), and by Theophrastus in his fourth book; it appears to have been a favourite food of horses. Pliny (21, 18) calls it Juncus triangularis or angulosus; it is probably the Juncus of Celsus (3, 21) mentioned as an ingredient in a diuretic medicine for dropsy, although he calls it Juneus quadratus" (Dymock, p. 844) Arabian and Persian writers describe the drug as

preferred. They are extensively used as an aromatic adjunct to numerous compound medicines. Special Opinions - 5 " Roots are aromatic and commonly used in indi-

matics with benefit" (Assist-In Civil Medical Charge, ised as an astringent in the Chand Sen, Teacher of Mediur used in fever" (Rev A

Campbell) "The fresh roots are stimulant and diaphoretic" (Bombay Gazette, VI , p 14)

Fodder.-Cattle eat this so-called grass, and hogs are remarkably fond of the roots.

Cyperus scariosus, R. Br.; C. B C, Linn Soc Jour, XXI, 159

Syn -- Cyperus Pertenuis, Roxb , Fl Ind , Ed CB C , 66. Vern.—Nagar métha, HIND, Nagar-mutha, Beng, Lawéla, Mar, Soade Luft, 200d, Arran, Musike samun, Pers, Nagar mustaka, Sans, Nagar motah, Dec, Muttak kuch, kénta kishangu, Tan Tunga gaddala seru, kélatunga mutée, Tet, Kéra kishanun, Mal,

Konnari gadde, KAN , Vomon niu, BURM References - Roxb, Fl. Ind, Ed. C.B.C., 66, Med. Top. Ajmir, 147, Dymock Mat. Med. W. Ind., 2nd. Ed., 815, Frame, Mat. Med. Patna, 75, Birdwood, Bomb. Pr., 94, Liotard, Dyes, Supp., IV

Habitat .- A delicate, slender grass, met with in damp places in Bengal,

Oudh, and rare in the Panjab, by no means so common a plant as C rotundus This is apparently the Koray kalung, Tam, the Nagar motha, Dux, and Musta, Sans, described by Ainslie (Mat, Ind II, 162) under the

name of Cyperus juncifolius, Rottler

Dye - The rhizomes are used in dyeing to give a scent to the fabric, and as a perfume for the hair. Hoxburgh describes them as "tuberous with many dark-coloured villous fibres" "Its naked deheate form, small and compound umbel, short slender leaves, and scanty involuce immediately distinguish it" from the other members of the genus

Medicine. - The ROOT is officinal, being considered cordial, stomachic, and desiccant, and is used for washing the hair. Also regarded as diaphoretic and diuretic. "Arabian and Persian writers mention this Indian MEDICINE,

FODDER. 2616

2617

DYE. 2018

MEDICINE. 2610

	Designary by the Leonomic
CYPERUS tegetum.	
MEDICINE	Cyperus, but consider it to be inferior to C. rotundus." "Two kinds o Nagarmoth are met with in the Bombay market—Surat and Kathawar the first is heavier and more aromatic than the second Value, Surat, Riper maund of 37½b, Kathawar Ril. The Surat Nagarmoth is probably obtained from Raputana, where the plant is common in tanks (Dymock) U C Dutt says. "The root of C pertenus is somewhat tuberous with many dark coloured willous hairs. It grows in low wet places, and is chiefly used in the preparation of medicated oils. Special Opinions.—§ "Roots, when bruised, have a fragrant smell, and for "t." a stock of the powdered root to wash the surgeon P Kinsley, Chicacolla Canadary, Morar) "The root is astringent, useful in diarribea" (Surgeon-Mayor & M Houston, Durbar Physir, Travancore and Cevil Apoth (Surgeon F. C. 'H. Peacocke, 1000). "Surgeon Mayor C. 'L. Peacocke, 1000." (Surgeon Mayor Cock), 1000." (Surgeon Mayor Cock), 1000." (Surgeon Mayor Cock), 1000." (Surgeon Mayor Rook), 1000." (Surgeon Mayor Rook), 1000.
2620	Cyperus stoloniferus, Retz, CB Clarke, Linn Soc Jour, XXI, 172
PERFUMERY. 2621	Syn - C LITTORALIS, R Br, C TUBEROSUS, Baker Vern - Gatamans: a name given in South India to this plant
	Res., II. 405—IV, 109, and which by Persian and Arab physicia is is called Sanbal s-Hands and Sanbal ul taib and in Upper India Jalamans and Balch har But as the true plant is only found at great elevations beyond the tropics the term is applied in South India to the sweet-smelling tubers grass (Sch nown also under
2622	C. tegetiformis, Rord., C.B. C., Linn Soc Jour, XXI, 157  Syn—C nudus Rord, F1 Ind., Ed C.B.C., 22 63 and 20, C. benga- Lensis Spreng Ven—Gula-methi, Beng, Sura, Santal
Pibre, Mats. 2623	Habitat — "A native of low wet places over Bengal, flowering during teams" (Rosé) Olarke mentions as localities—Calcutta, Chittagong, Noakhali, Burisal, Mymensing, Pundua, and Assam He also states that the plant occurs in China and Japan Fibre—Roxburgh writes "This species is very like C. tegetum,
2624	C. tegetum, Royb, C.B. Clarke, Linn. Soc Jour., XXI, 160  STR.—C. CORYMBOSUS, Korning, in part, C. SCHIMPERIANUS, Stend ; C. DEHULET'S Stend C. PANGORE! Themster from Reith Enum 11 Zept, 324, Purpus denserva, Nees in Night Control 809 C. Pingore, Vice (the greater part) and C. CORYMBOSUS, Nees
,	C. 2624 C

### Mats and Matting.

CYPERUS tegetum.

Note by Mr. Clarke: "The plant, abundant in Indusis the authentic Treets", Nost, it differs decidely from C. conventors in the much more distant glumer, which in the dired specimens have the margins incurred not overlappine. The spikelist are more compressed than those of C. CORYMOUS, and The spikelist are more compressed than those of C. CORYMOUS, The coorse in Industrates from pale to a high red-lument with the more highly coloured indian examples many African are absolutely sentral; but there are other African specimens chestnut or for the control of t

Vern -Mudar-Itai, Beng ; Wella, Burn.

the

Habitat. A common species in India, Abyssiair, and Egypt. Mr. Clarke mentions the following localities: Almora (1,200 feet), Chumba

culms are split into two or three, and then woven into mats upon a warp of threads previously stretched across the floor of a room. The materials passes the culms with the hand alternately over and under the successive threads of the warp, and presses them home

In different districts of India it is believed that two or three allied pecies are used for this purpose. In Madras the form C corymbosus seems to be chiefly used. Royle repeating Roxburgh states "that the culms or stalks of the plant when green are split into three or four preces, which, in dring, contract so much as to bring the mangers in

trade in these sedge-mais has greatly increased, and at the present day it may be said that they form a regular article of export to Europe. In the Trade Returns, however, all mats are collectively returned, so that it is impossible to give the actual figures. The exports of "mats" were last year valued at R.1.16.

TRADE. 2626

FIBRE.

Mats.